Vol. 939 Number 3

OFFICIAL GAZETTE

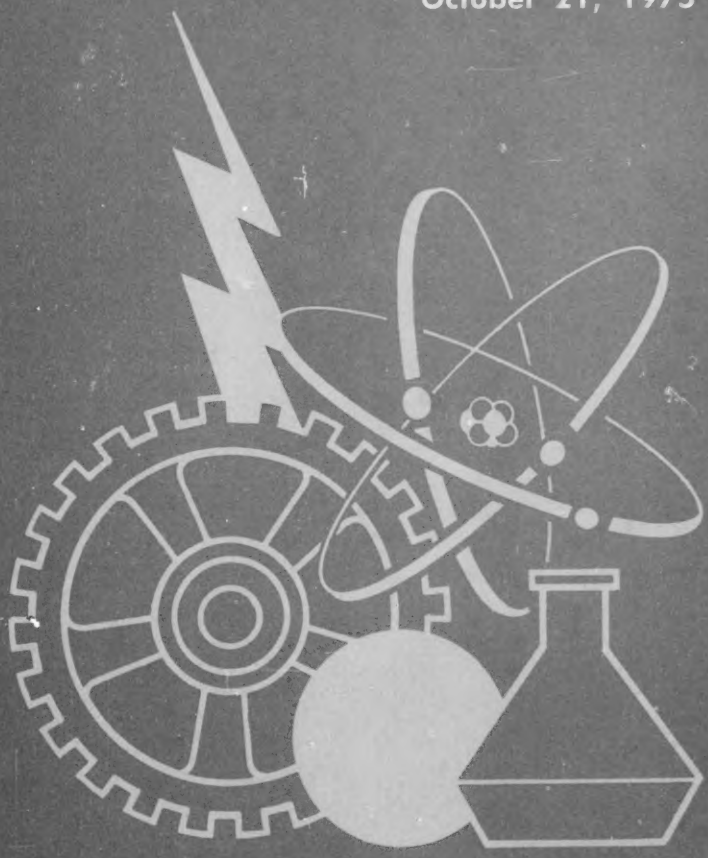
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

AMOCO OIL CO.
OCT 27 1975
RESEARCH LIBRARY

PATENTS

October 21, 1975



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the
UNITED STATES PATENT and TRADEMARK OFFICE

October 21, 1975 Volume 939 Number 3

CONTENTS

	Page
Patent and Trademark Notices	
Suspension from Practice	1110
Patent Suits	1110
Patent Notices	
Certificates of Correction for the Week of October 21, 1975	1111
Corrected Disclaimer and Dedication	1111
Disclaimers and Dedications	1111
Disclaimers	1111
Patents Available for Licensing or Sale	1111
Condition of Patent Applications	1115
Reissue Patents Granted (28,573)	1116
Patents Granted	
General and Mechanical (3,913,146)	1119
Chemical (3,914,106)	1443
Electrical (3,914,526)	1548
Design Patents Granted (237,223)	1643
Index of Patentees	PI 1
Cross Reference of Published Patent Applications Published Under Trial Voluntary Protest Program	PI 50
Indices of Applicants of Reissues and Designs	PI 51
Classification of	
Patents (Including Reissues)	PI 53
Designs	PI 56
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 57
Designs	PI 59

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum, foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS and DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Suspension From Practice

Halbert E. Whitaker (Registration No. 16,927) has been indefinitely suspended from further practice before the United States Patent and Trademark Office.

Sept. 25, 1975.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,740,265, J. R. Bayston, MACHINE FOR MANUFACTURING ICE CUBES; **2,763,993,** same, ICE CUBE MANUFACTURING APPARATUS; **3,009,336,** Bayston and Kuebler, ICE MAKING MACHINE, **filed** July 2, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c2182, *Uniflow Manufacturing Co. and Icecrafter Trust* v. *Liquid Carbonic.*

2,763,993. (See 2,740,265.)

2,843,075, R. M. Geraghty, ALARM DEVICE, **filed** Jan. 11, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c104, *E. D. Bullard Company* v. *Trippe Manufacturing Company.* Enter order pursuant to stipulation of the parties that this cause be and the same hereby is dismissed with prejudice pursuant to Rule 41(a)(1)(ii), July 1, 1975.

2,888,950, C. Wheatley, HYDRAULIC CHECK VALVE; **2,918,934,** same, CHECK VALVE; **3,186,724,** same, FLOATING STUFFING GLAND; **3,817,277,** same, WAFERUNIT CHECK VALVE, **filed** June 18, 1975, D.C., N.D. Okla. (Tulsa), Doc. 75–C–239, *Wheatley Company* v. *Crown Valves, Inc. and Nicholas M. Rylander.*

2,918,934. (See 2,888,950.)

2,938,977, R. M. Koening, ELECTRIC SWITCHING MAT, **filed** Oct. 5, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c2567, *Tapeswitch Corporation of America* v. *Recora Co., Inc.* Court finds patent invalid. Complaint dismissed with judgment in favor of the defendant, June 23, 1975.

3,009,336. (See 2,740,265.)

3,051,822, Bernard and Bernard, WELDING WITH BLANKET AND GAS ARC-SHIELD, **filed** May 16, 1975, D.C. Conn. (New Haven), Doc. N–75–130, *Chemetron Corporation* v. *Unicore, Inc.*

3,098,578, J. Rudelick, PRESSURE VESSEL, **filed** June 27, 1975, D.C., E.D. Wis. (Milwaukee), Doc. 75–362, *Park International Corporation and Calgon Corporation* v. *Amalga Corporation.*

3,164,350, R. H. Taub, MERCHANDISE DISPLAY STAND, **filed** Mar. 3, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c689, *Melvin Pollack et al.* v. *Pace Promotions, Inc. et al.* Final judgment by consent, parties agree that claims 1 and 2 of patent are valid. All charges in the complaint against defendant and all charges in the counterclaim against the plaintiffs are hereby dismissed, July 9, 1975.

3,174,863, A. A. Shoup, SMOKELESS BROILER, **filed** June 20, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c2025, *Marian Shoup* v. *McGraw-Edison Company.*

3,186,724. (See 2,888,950.)

3,209,066, Toomey and Toomey, PRINTED CIRCUIT WITH INTEGRAL WELDING TUBELETS; **3,256,586,** Douglas and Reimann, WELDED CIRCUIT BOARD TECHNIQUE; **3,434,208,** Toomey and Toomey, CIRCUIT ASSEMBLY PROCESS; **3,345,741,** W. G. Reimann, WELDABLE PRINTED CIRCUIT BOARD TECHNIQUES; **3,469,019,** same, WELDABLE PRINTED CIRCUIT BOARD, **filed** June 1, 1972, United States Court of Claims (District of Columbia), Doc. 232–72, *William H. Toomey, John W. Toomey and Litton Systems, Inc.* v. *The United States, Epsco, Inc., LFE Corporation, and Bendix Corporation.* Order judgment entered for plaintiffs and against the United States, Apr. 18, 1975.

3,215,072(a), Kooch and Fennimore, ADDRESS CARD; **3,526,262,** H. Yoshida, ADDRESS MASTER CARD, **filed** Apr. 3, 1975, D.C., S.D.N.Y., Doc. 75–C–1639, *Scriptomatic Inc.* v. *Mailers Equipment Co. Inc.*

3,215,072(b), Kooch and Fennimore, ADDRESS CARD; **3,526,262,** H. Yoshida, ADDRESS MASTER CARD; **Reg. No. 764,325** (SCRIPTAMASTER), Scriptomatic, Inc.; **Reg. No. 785,470** (SCRIPTOMATIC), same; **Reg. No. 785,623,** same, **filed** May 27, 1975, D.C., C.D. Calif. (Los Angeles), Doc. CV–75–1773–IH, *Scriptomatic, Inc.* v. *Speedaddress, Inc. et al.*

3,228,413, F. F. Stevens, Jr., KEG TAPPING DEVICE, **filed** June 30, 1975, D.C., E.D. Wis. (Milwaukee), Doc. 75–377, *Hoff-Stevens, Inc.* v. *Draft Service, Inc.*

3,256,586. (See 3,209,066.)

3,268,636, R. G. Angell, Jr., METHOD AND APPARATUS FOR INJECTION MOLDING FOAMED PLASTIC ARTICLES; **3,436,446,** same, MOLDING OF FOAMED THERMOPLASTIC ARTICLES, **filed** Mar. 27, 1975, D.C., W.D. Tex. (San Antonio), Doc. A–75–CA–45, *Union Carbide Corporation* v. *Kerr-Ban Furniture Manufacturing Co., Inc.*

3,345,741. (See 3,209,066.)

3,421,587, Heavilon, Jones and Thomas, METHOD FOR MINE FIRE CONTROL, **filed** May 23, 1974, United States Court of Claims (Washington, D.C.), Doc. 261–69, *Amax Fly Ash Corporation* v. *The United States.* Order that claim 1 of patent is valid and infringed. Judgment is entered, accordingly, for plaintiff with the extent of defendant's liability to be determined in further proceeding pursuant to Rule 131(c)(2), Apr. 16, 1975.

3,434,208. (See 3,209,066.)

3,436,446. (See 3,268,636.)

3,463,197, W. L. Slade, WIRE-BRAIDED HYDRAULIC HOSE, **filed** July 14, 1975, D.C. Del. (Wilmington), Doc. 75–195, *Raybestos-Manhattan, Inc.* v. *Atlas Corporation.*

3,469,019. (See 3,209,066.)

3,526,262. (See 3,215,072 (*a* and *b*).)

3,735,453, R. L. Nathans, SAFETY PIN WITH PIN POINT GUARD FOR PREVENTING MANUAL REMOVAL OF SAID POINT FROM SAID GUARD, **filed** July 9, 1975, D.C. Mass. (Boston), Doc. 75–2814–T, *Robert L. Nathans* v. *Sensormatic Electronics Corporation.*

3,760,335, L. E. Roberts, PRE-LOADED ELECTRIC CONNECTOR, **filed** July 3, 1975, D.C., N.D. Ill. (Chicago), Doc. 75c2204, *AMP Incorporated* v. *Bunker Ramo Corporation et al.*

3,810,604, J. A. Reiter, TANK AGITATING AND CLEANING SYSTEM, **filed** Aug. 27, 1974, D.C., N. Mex. (Albuquerque), Doc. 74–416–C, *Tanks, Inc.* v. *Reiter Industries, Inc.* Order that claims 6, 7, and 8 of patent are invalid under Sections 103 and 102 of Title 35, U.S.C.A., July 14, 1975.

3,817,277. (See 2,888,950.)

3,826,066, F. Higgins, DOUBLE-WALL FILTER BAG CONSTRUCTION; **3,850,594,** same, FILTERING METHOD UTILIZING A DOUBLE-WALL FILTER BAG CONSTRUCTION, **filed** July 10, 1975, D.C., W.D. Va. (Roanoke), Doc. 75–0104, *Summit Filter Corporation* v. *The Carborundum Company and Carborundum Environmental Systems, Inc.*

3,850,594. (See 3,826,066.)

Re. 27,528, Looker, Greedy, METHOD OF AND APPARATUS FOR HARVESTING VINE CROPS, **filed** July 16, 1975, D.C., E.D. Calif. (Sacramento), Doc. S–75–478, *FMC Corporation* v. *Johnson Farm Machinery Co., Inc.*

D. 191,787, R. M. Heil, CLIP, **filed** Mar. 21, 1974, D.C. N.D. Ohio (Cleveland), Doc. C74–245, *Ruth M. Heil* v. *S. S. Kresge Company.* Stipulation and order dismissing case with prejudice, May 7, 1975.

Reg. No. 764,325. (See 3,215,072(b).)

Reg. No. 785,470. (See 3,215,072(b).)

Reg. No. 785,623. (See 3,215,072(b).)

Certificates of Correction for the Week of Oct. 21, 1975

Re. 28,450	3,833,747	3,879,407	3,892,439
Re. 28,486	3,836,243	3,879,464	3,892,851
3,533,835	3,840,773	3,879,973	3,893,276
3,629,035	3,842,601	3,880,300	3,893,392
3,651,270	3,843,821	3,880,666	3,893,488
3,660,600	3,848,320	3,880,694	3,893,510
3,662,349	3,849,163	3,880,727	3,893,595
3,665,109	3,851,866	3,880,739	3,893,648
3,671,677	3,853,520	3,880,743	3,894,098
3,671,678	3,854,395	3,881,016	3,894,557
3,671,702	3,856,865	3,881,673	3,894,928
3,676,603	3,858,616	3,882,122	3,895,036
3,676,747	3,859,361	3,882,348	3,895,061
3,686,185	3,861,421	3,882,493	3,895,073
3,688,201	3,861,608	3,882,495	3,895,327
3,692,946	3,862,925	3,882,980	3,895,409
3,694,583	3,864,400	3,883,441	3,895,690
3,699,263	3,866,090	3,884,692	3,896,175
3,702,380	3,867,282	3,885,046	3,896,998
3,705,176	3,867,460	3,885,125	3,897,452
3,705,268	3,868,921	3,885,609	3,897,535
3,707,140	3,869,454	3,886,162	3,897,596
3,712,963	3,870,209	3,886,181	3,897,888
3,715,503	3,871,964	3,886,206	3,897,914
3,717,487	3,872,456	3,887,319	3,898,032
3,718,907	3,873,714	3,887,462	3,898,051
3,719,784	3,874,135	3,888,616	3,898,153
3,739,238	3,874,767	3,888,851	3,898,156
3,741,957	3,874,873	3,890,208	3,898,194
3,770,911	3,875,481	3,890,353	3,898,214
3,775,463	3,875,493	3,890,788	3,898,220
3,775,573	3,875,887	3,890,846	3,898,386
3,778,630	3,876,117	3,890,937	3,898,779
3,793,501	3,876,212	3,890,983	3,898,789
3,802,565	3,876,485	3,891,024	3,899,181
3,805,013	3,877,955	3,891,075	3,899,400
3,809,116	3,878,157	3,891,240	3,899,651
3,819,238	3,878,161	3,891,772	3,899,867
3,830,812	3,878,820	3,891,980	3,900,131
3,833,380	3,879,001	3,892,031	3,900,320
3,833,688	3,879,046	3,892,083	3,900,497

Corrected Disclaimer and Dedication

3,768,535.—*Ernest L. Holden*, Phoenix, Ariz. TIRE TREAD. Patent dated Oct. 30, 1973. Disclaimer and dedication filed Mar. 27, 1975, by the inventor.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

Disclaimers and Dedications

2,909,028.—*Marvin H. Comer* and *Devoy W. Terrell*, Burlington, and *Charlie A. Miles*, Alamance, N.C. DUAL TORQUE YARN AND METHOD OF MAKING SAME. Patent dated Oct. 20, 1959. Disclaimer and dedication filed July 31, 1975, by the assignee, *Patentex, Inc.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

3,007,327.—*Randolph I. Isley*, Burlington, N.C. TIGHTS AND METHOD OF MAKING. Patent dated Nov. 7, 1961. Disclaimer and dedication filed July 31, 1975, by the assignee, *Patentex, Inc.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

3,035,396.—*Earl H. Biggers*, Concord, N.C. TORQUE LOW TWIST YARN AND MACHINE AND METHOD FOR PRODUCING THE SAME. Patent dated May 22, 1962. Disclaimer and dedication filed July 31, 1975, by the assignee, *Patentex, Inc.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

3,148,520.—*Earl H. Biggers*, Concord, N.C. METHOD FOR SIMULTANEOUSLY THROWING AND KNITTING OF YARN. Patent dated Sept. 15, 1964. Disclaimer and dedication filed July 31, 1975, by the assignee, *Patentex, Inc.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

Disclaimers

3,212,840.—*Robert J. Roman* and *Victor J. Witkowski*, Rochester, N.Y. FILM FEEDING MECHANISM. Patent dated Oct. 19, 1965. Disclaimer filed Aug. 14, 1975, by the assignee, *Eastman Kodak Company.*

Hereby enters this disclaimer to claim 16 of said patent.

3,721,797.—*Masayasu Arikawa* and *Motomi Kano*, Fujisawa, and *Naoki Okuda*, Kamakura, Japan. WELDING PROCESS AND PLURAL LAYERED BACKING MATERIAL. Patent dated Mar. 20, 1973. Disclaimer filed Apr. 1, 1974, by the assignee, *Kobe Steel, Ltd.*

The term of this patent subsequent to Dec. 22, 1987, has been disclaimed.

3,727,946.—*Leo E. Hearn*, Flint, Mich. BAGGAGE CART. Patent dated Apr. 17, 1973. Disclaimer filed Aug. 7, 1975, by the assignee, *Saginaw Products Corporation.*

Hereby enters this disclaimer to claims 1, 3 and 13 of said patent.

Patents Available for Licensing or Sale

2,861,337. MECHANICAL MEMORY DEVICE. Daniel Thompson, 936 Kumukoa St., Hilo, Hawaii 96720.

3,642,242. TRAVEL TRAILER SUPPORTING MEANS. Floyd E. Danekas, 1238 Sixth St., La Salle, Ill. 61301.

3,713,418. MACHINE FOR APPLYING HIGH CONSISTENCY FLUID AND SEMI-SOLIDS TO BAKERY AND OTHER PRODUCTS. Walter L. Griffith, 51 E. Cavalier Rd., Scottsville, N.Y. 14546.

3,780,874. UTILITY TREE. Hershel Stacy, Sr., Route #2, Box 511, Hazard, Ky. 51701.

3,828,814. ELECTRICAL CONTROL ARRANGEMENT FOR GAS OR STEAM TURBINES. Klaus Neumann and Wolfgang Fritz, Both of Berlin, Germany, assignor VEB Bergmann-Borsig/ Goerlitzer Maschinenbau Wilhelmsruh, Berlin, Germany. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,839,050. BROILER AND BARBECUER. Arthur E. Gordon, 711 Austin St., Sands Motel, Truth or Consequences, N. Mex. 87901.

3,846,297. CHROMATOGRAPHY. Wallace Thaw, 30 Woodside Drive, Moraga, Calif. 94556.

3,863,804. MEDICAMENT-DISPENSING CONTAINER. Francisco Infante-Diaz, Mexico. Correspondence: Goodrich, Dalton, Little & Riquelma, Apartado Postal 93 Bis, Mexico City 1, Mexico.

3,871,696. DANDELION PICKER TOOL. Edwin M. Wesley, 2405 Randolph St., NE., Washington, D.C. 20018.

3,871,844. SCREEN APPARATUS FOR AIR INLET. Frank F. Calvin, Sr., 3792 Donaldson Drive, Chamblee, Ga. 30341.

3,872,527. LUG NUT WRENCH TOOL. Robert L. Tregoning, ESD DET 11, USAF Field Office "M" APO San Francisco, Calif. 96369.

3,873,119. BOWLING BALL CART. Clyde M. Koch, 3907 Bennington St., Philadelphia, Pa. 19124.

3,879,792. WINDSHIELD WIPER FOR AUTOMOTIVE VEHICLES. Robert Bosch GmbH, Germany. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,885,708. FLEXIBLE TUBE WINDING AND EMPTYING DEVICE. David W. Parry, 2390 North Forest, Getzville, N.Y. 14068.

3,885,823. WINTER EMERGENCY BRAKE SYSTEM. Roy Lee, 52 Tennyson St., Somerville, Mass. 02145.

3,894,907. APPARATUS FOR MANUFACTURING A FLATTENED CYLINDRICAL FILM CONSISTING OF LAYERS OR THERMOPLASTIC RESIN STRETCHED CROSSWISELY. Michio Sudo, % Nikko Resin Co. Ltd., Japan. Correspondence to: Michael S. Striker, 360 Lexington Ave., New York, N.Y. 10017.

3,895,840. SEAT ADAPTER. Dolores Szurszewski, 422 Meadow Road, Glenshaw, Pa. 15116.

3,896,687. MAGNETIC TIRE CHAIN INSTALLING DEVICE. Sidney C. Cloud, Rt. 1, Box 1834, Shingle Springs, Calif. 95682.

3,900,196. SOUND EFFECT TOY GAME COMBINATION. Thomas John Suttner, Palmetto, Fla. Correspondence to: Sherman Levy, Suite 635 Washington Building, 15th and New York Ave. NW., Washington, D.C. 20005.

3,901,367. COIN TESTING APPARATUS. Kuniaki Miyazawa, assigned to Mitani Shoji Co., Ltd., Japan. Correspondence to: Hall & Myers, Post Office Box 34436, Washington, D.C. 20034.

3,901,614. REFRACTIVE SPHERICAL ROADWAY MARKER. James L. Overacker, 17075 Piedmont Court, Morgan Hill, Calif. 95037.

The following 2 patents are offered by Herbert E. Weyrauch, 2800 East Minnehaha Parkway, Minneapolis, Minn. 55406.

3,586,627. PROCESS FOR AGGLOMERATING AND COAGULATING WASTE MATERIAL.

3,754,120. APERTURED CARD READER AND DIGITAL DATA COLLECTION SYSTEM.

General Motors Corporation is prepared to grant non-exclusive licenses under the following 6 patents upon reasonable terms.

Applications for license may be addressed to the director, Patent Section, General Motors Building, 3044 West Grand Blvd., Detroit, Mich. 48202.

3,653,976. THERMOCOUPLE PROBE ASSEMBLY WITH NICKER ALUMINIDE TIP.

3,655,223. CASING JOINT.

3,656,864. TURBOMACHINE ROTOR.

3,656,865. ROTOR BLADE RETAINER.

3,658,249. APPARATUS AND METHOD FOR BURNING CONTAMINATED FUEL.

3,666,528. METHOD OF APPLYING FILLED POLYIMIDE COMPOSITIONS.

General Electric Company is prepared to grant non-exclusive licenses under the following 78 patents upon reasonable terms to domestic manufacturers.

Applications for licenses under the following 1 patent may be addressed to the Patent Counsel, Mobile Radio Prods. Dept. General Electric Company, Lynchburg, Va. 24502.

3,902,122. APPARATUS FOR SPEEDING-UP THE ATTACK TIME OF A TONE-CODED RADIO RECEIVER.

Application for license under the following 6 patents may be addressed to: Patent Counsel Ordnance System Department, General Electric Company, 100 Plastice Ave., Pittsfield, Mass. 01201.

3,198,721. PROCESS AND APPARATUS FOR DETECTING GAS.

3,288,649. WATER ACTIVATED BATTERY.

3,786,357. DIGITAL PULSE TRAIN FREQUENCY MULTIPLIER.

3,802,065. METHOD AND STRUCTURE FOR MOUNTING SEMI-CONDUCTOR CHIPS.

3,829,786. DYNAMIC CONSTRAINT OF A CONTROL SIGNAL.

3,851,234. METHOD OF OBTAINING SPTIMUN SPEED-TORQUE CHARACTERISTICS FOR AN INDUCTION MOTOR WHILE GUARANTEEING A NON-SATURATING MAGNETIZING CURRENT.

Application for license under the following 7 patents may be addressed to: Division Patent Counsel, Switchgear Equipment Business Div., General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa. 19142.

3,319,121. MEANS COMPRISING A TRIGGERED VACUUM CIRCUIT INTERRUPTER FOR PROTECTION AGAINST OVERVOLTAGES.

3,356,893. HIGH POWER VACUUM DISCHARGE DEVICE HAVING A PAIR OF INTERLEAVED MULTIVANED ARCING ELECTRODES.

3,356,894. MULTIPLE STAGE CASCADED TRIGGERED VACUUM GAP DEVICES.

3,411,038. VACUUM-TYPE CIRCUIT INTERRUPTER.

3,432,713. HIGH CURRENT VACUUM GAP DEVICES WITH SLOTTED ELECTRODE VANES.

3,783,213. VACUUM TYPE ELECTRIC CIRCUIT INTERRUPTER.

3,890,258. ELECTRIC CIRCUIT BREAKER WITH SERIES CONNECTED INTERRUPTING AND ISOLATING BREAKS.

Application for license under the following 10 patents may be addressed to: Division Patent Counsel, Electronics Systems Division, General Electric Company, Building 3, Room 216, Electronics Park, Syracuse, N.Y. 13201.

3,569,871. WAVEGUIDE TAPER OF MINIMUM LENGTH AND METHOD OF FABRICATION.

3,659,227. SWITCH CONTROLLED DIRECTIONAL COUPLER.

3,665,335. COOLABLE SLAB LASER.

3,673,353. MAGNETIC TRANSDUCER HAVING A COMPOSITE MAGNETIC CORE STRUCTURE.

3,675,232. VIDEO GENERATOR FOR DATA DISPLAY.

3,689,900. PHOTO-CODED DIODE ARRAY FOR READ-ONLY MEMORY.

3,694,911. WAVEGUIDE PROCESS.

3,715,753. COHERENT RANGE AND LENGTH RESOLUTION.

3,740,655. DIGITAL GENERATION OF QUADRATURE SAMPLES.

3,766,439. ELECTRONIC MODULE USING FLEXIBLE PRINTED CIRCUIT BOARD.

Application for license under the following 20 patents may be addressed to: Group Patent Counsel, Major Appliance Business Group General Electric Company, Alliance Park, Louisville, Ky. 40225.

D. 235,126. PORTABLE MICROWAVE OVEN OR SIMILAR ARTICLE.

D. 235,799. CLOTHES SCRUBBING DEVICE FOR ATTACHMENT TO A WASHING MACHINE LID.

3,738,727. APPLIANCE ANTI-TIP DEVICE.

3,746,824. MICROWAVE OVEN LEAKAGE RADIATION DETECTING DEVICE.

3,748,424. BUILT-IN LEAKAGE RADIATION DETECTING DEVICE FOR A MICROWAVE OVEN.

3,749,875. MICROWAVE OVEN LEAKAGE DETECTION SYSTEM.

3,842,338. EXTENDED OUTPUT POWER CONTROL OF INVERTER.

3,883,719. GLASS-CERAMIC COOKTOP WITH FILM HEATERS.

3,885,128. GLASS-CERAMIC PLATE HEATING UNIT CAST-IN HEAT SPREADER.

3,886,859. COMPACTOR BRAKE.

3,887,960. SHAFT BUSHING TO PREVENT SOIL MIGRATION.

3,888,166. MOLDED PLASTIC FLUE DAMPER.

3,888,171. REFUSE COMPACTOR.

3,889,099. DOOR COOLING SYSTEM.

3,889,100. OVEN VENTILATING SYSTEM.

3,889,609. AIR-COOLED ELECTRIC TERMINALS FOR AN INCINERATOR.

3,893,387. COMPACTOR HAVING IMPROVED CABINET STRUCTURE.

3,893,442. OVEN DOOR WITH AIR COOLING SYSTEM.

3,894,214. DOORLOCKING APPARATUS FOR A COOKING OVEN.

3,894,485. PIVOTAL SHELF CONTROL MEANS FOR REFUSE COMPACTOR.

Application for license under the following 34 patents may be addressed to: General Electric Company, Patent Counsel, Silicone Products Department, Chemical and Metallurgical Division, Waterford, N.Y. 12188.

3,154,515. FLAME RETARDANT COMPOSITIONS.

3,188,299. PREPARATION OF STABLE MIXTURES OF ORGANOSILICON COMPOSITIONS IN THE PRESENCE OF A NITROGEN-CONTAINING LIGAND.

3,188,300. PREPARATION OF STABLE COPOLYMERIZABLE ORGANOSILICON COMPOSITIONS CONTAINING A PLATINUM CATALYST AND A PHOSPHOROUS LIGAND.

3,271,359. EQUILIBRATION OF ORGANOPOLYSILOXANES USING PHOSPHOROUS-CONTAINING CATALYSTS.

3,271,362. PROCESS FOR REACTION OF SILANIC HYDROGEN WITH UNSATURATED ORGANIC COMPOUNDS.

3,291,772. SILYLAMINESILOXANES AND POLYFUNCTIONAL ACIDS FOR ENCAPSULATING COMPOSITIONS.

3,296,196. SILOXANE POLYMERS CONTAINING ALLYLCINNAMATE GROUPS.

3,296,291. REACTION OF SILANES WITH UNSATURATED OLEFINIC COMPOUNDS.

3,310,526. CYCLOPOLYSILOXANES.

3,325,525. PROCESS FOR PREPARING PHENYLSILOXANEDIOLS.

3,328,348. TRIFLUOROMETHYLPHENYL POLYSILOXANES.

3,332,972. METHYLPHENYL CYCLOSILOXANES.

3,337,510. ORGANOSILICON COMPOSITIONS & METHODS FOR PREPARING SAME.

3,346,588. SILICON-SUBSTITUTED PYRROLES.

3,349,048. METHOD FOR MAKING LINEAR POLYDIARYSILOXANES.

3,352,799. ORGANOSILICON CARBOIMIDE POLYMER.

3,360,538. FLUOROORGANO-SUBSTITUTED SILANES.

3,367,955. 1,1 - DIALKYL - 3,3,5,5,7,7, - CYCLOTETRASILOXANE.

3,383,356. HALOCARBON CATALYST INHIBITORS FOR REACTIVE ORGANOSILICON COMPOSITIONS.

3,410,820. RTV COMPOSITIONS.

3,415,728. PHOTOPOLYMERIZATION OF CYCLOTRISILOXANES.

3,444,229. DISILAHEXANEDIOL.

3,452,071. CYCLIC ORGANOSILICON COMPOUNDS CONTAINING ALKYLENE UNITS.

3,452,072. BICYCLIC ORGANOSILICON COMPOUNDS WITH ALKYLENE LINKAGE.

3,506,699. HETEROCYCLIC COMPOUNDS CONTAINING HETERO SULFUR AND SILICON ATOMS.

3,532,726. ACYLOXY MERCURY-SUBSTITUTED ORGANOSILICON COMPOUNDS.

3,584,023. ACETOXYALKYLACETOXYSILANES.

3,598,851. CYCLIC ORGANOSILICON MATERIALS.

3,625,917. ORGANOSILICON MATERIALS.

3,715,370. XANTHENYL KETONE-CONTAINING ORGANOSILICON MATERIALS.

3,799,838. CLEANER & PRIMER COMPOSITION FOR METAL SURFACES.

3,816,282. RADIATION INDUCED POLYMERIZATION OF POLYSILOXANES.

3,861,543. BOX POSITIONING APPARATUS AND METHOD FOR USE THEREOF.

3,880,155. THERAPEUTIC APPLIANCES.

RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the following 83 patents listed below. Inquiries respecting licenses under RCA patents should be addressed to: RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y. 10036.

3,887,371. PHOTOGRAPHIC METHOD FOR PRINTING VIEWING-SCREEN STRUCTURE INCLUDING TREATMENT OF EXPOSED COATING WITH AMMONIUM COMPOUND.

3,887,878. TRANSISTOR SERIES AMPLIFIER.

3,887,879. CURRENT MIRROR.

3,887,880. BIAS CIRCUITRY FOR STACKED TRANSISTOR POWER AMPLIFIER STAGES.

3,887,916. CORRELATOR AND CONTROL SYSTEM FOR VEHICULAR COLLISION AVOIDANCE.

3,887,924. SCANNING ANTENNA.

3,888,053. METHOD OF SHAPING SEMICONDUCTOR WORKPIECE.

3,888,493. APPARATUS FOR INHIBITING A PLURALITY OF RECORDS FROM BEING DISPOSED ON A TURNTABLE.

3,888,706. METHOD OF MAKING A COMPACT GUARD-BANDED MOS INTEGRATED CIRCUIT DEVICE USING FRAMELIKE DIFFUSION MASKING STRUCTURES.

3,889,151. ENERGIZING TECHNIQUE FOR ELECTROLUMINESCENT DEVICES.

3,889,253. RASTER-SCAN DISPLAY SYSTEM HAVING IMPROVED MEANS FOR READING OUT STORED GAME-SCORE INFORMATION.

3,889,260. ANALOG ECHO PROTECTION CIRCUIT FOR DME.

3,889,551. EQUIPOSIE MECHANISM.

3,890,194. METHOD FOR DEPOSITING ON A SUBSTRATE A PLURALITY OF EPITAXIAL LAYERS IN SUCCESSION.

3,890,630. IMPATT DIODE.

3,890,632. STABILIZED SEMICONDUCTOR DEVICES AND METHOD OF MAKING SAME.

3,890,633. CHARGE-COUPLED CIRCUITS.

3,891,478. DEPOSITION OF EPITAXIAL LAYER FROM THE LIQUID PHASE.

3,891,886. CATHODE RAY TUBE HAVING A LUMINESCENT SCREEN INCLUDING A TWO COMPONENT WHITE-EMITTING PHOSPHORIC MIXTURE.

3,891,891. HIGH VOLTAGE PROTECTION CIRCUIT.

3,891,892. START-UP CONTROL CIRCUIT FOR SCR DEFLECTION.

3,891,895. GROUND FAULT DETECTION.

3,891,935. TRANSISTOR BIASING ARRANGEMENT.

3,881,734. ROTARY STYLUS CLEANER.

3,882,041. EUROPIUM-ACTIVATED ALKALINE-EARTH PYROPHOSPHATE PHOSPHORS.

3,882,207. PROCESS OF PRODUCING DOUBLE-SIDED HOLOGRAPHIC REPLICAS.

3,882,214. TRAPEZOIDAL SMOOTH GROOVES FOR VIDEO DISC.

3,882,267. VIDEO PLAYBACK SYSTEM TRACKING ARM AND PICKUP ASSEMBLY.

3,882,273. OPTICAL BEAM SCANNING SYSTEM.

3,882,327. ABSOLUTE VALVE CIRCUIT EMPLOYING OPPOSITE CONDUCTIVITY TYPE SWITCHES.

3,882,328. CROSS OVER DETECTOR AND RECTIFIER.

3,882,350. DYNAMIC CONVERGENCE CIRCUIT.

3,882,407. AMPLIFIER BLANKING CIRCUIT.

3,882,419. VARACTOR TUNED IMPATT DIODE MICROWAVE OSCILLATOR.

3,882,420. MAGNETICALLY TUNABLE FERRITE STRIPLINE TRAPATT MODE OSCILLATOR AND AMPLIFIER CIRCUITS.

3,882,493. DOPPLER CORRELATION RADAR EXHIBITING REDUCED TIME SIDE LOBES.

3,882,494. DOPPLER CORRELATION RADAR PROVIDING COMBINED TARGET DETECTION AND RANGING.

3,882,495. DOPPLER CORRELATION RADAR PROVIDING COARSE-RANGE DETECTION RESOLUTION.

3,882,728. TEMPERATURE SENSING CIRCUIT.

3,883,313. MODIFIED CZOCHRALSKI-GROWN MAGNESIUM ALUMINATE SPINEL AND METHOD OF MAKING SAME.

3,883,703. METHOD FOR CONDITIONING TRANSMISSION LINES UTILIZING ADJUSTABLE EQUALIZERS AND A RECORDING TECHNIQUE.

3,883,888. EFFICIENCY LIGHT EMITTING DIODE.

3,883,891. REDUNDANT SIGNAL PROCESSING ERROR REDUCTION TECHNIQUE.

3,884,007. HERMETIC SEAL AND METHOD.

3,884,539. METHOD OF MAKING A MULTIALKALI ELECTRON EMISSIVE LAYER.

3,885,061. DUAL GROWTH RATE METHOD OF DEPOSITING EPITAXIAL CRYSTALLINE LAYERS.

3,885,198. HIGH VOLTAGE REGULATOR.

3,885,201. FAIL-SAFE HIGH VOLTAGE PROTECTION CIRCUIT.

3,885,860. FABRICATION OF LIQUID CRYSTAL DEVICES.

3,886,307. ON-OFF SYSTEM FOR TELEVISION RECEIVERS.

3,886,394. IMAGE DISPLAY EMPLOYING FILTER COATED PHOSPHOR PARTICLES.

3,886,410. SHORT CIRCUIT PROTECTION APPARATUS FOR A REGULATED POWER SUPPLY.

3,886,435. VBE VOLTAGE SOURCE TEMPERATURE COMPENSATION NETWORK.

3,886,454. CONTROL APPARATUS FOR A TWO-WAY CABLE TELEVISION SYSTEM.

3,886,460. PULSE POSITION DISCRIMINATOR.

3,886,464. SELF-BIASED COMPLEMENTARY TRANSISTOR AMPLIFIER.

3,886,466. BIAS CIRCUITRY FOR STACKED TRANSISTOR POWER AMPLIFIER STAGES.

3,886,505. SEMICONDUCTOR PACKAGE HAVING MEANS TO TUNE OUT OUTPUT CAPACITANCE.

3,897,627. METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICES.

3,897,628. METHOD OF FORMING A THIN PIEZOELECTRIC BODY METALLICALLY BONDED TO A PROPAGATION MEDIUM CRYSTAL.

3,898,082. METHOD OF MAKING A TRANSPARENCY OF A COLORED IMAGE IN A MAGNETO-ELECTRIC PRINTING SYSTEM.

3,898,107. METHOD OF MAKING A JUNCTION-ISOLATED SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE.

3,898,358. HOLOGRAPHIC RECORDING MEDIA.

3,898,375. NOTCH REJECTION FILTER.

3,898,509. CATHODE-RAY TUBE HAVING LITHIUM SILICATE GLARE REDUCING COATING WITH REDUCED LIGHT TRANSMISSION AND METHOD OF FABRICATION.

3,898,525. HYSTERESIS VOLTAGE SUPPLY FOR DEFLECTION SYNCHRONIZING WAVEFORM GENERATOR.

3,898,553. CIRCUIT FOR SUPPLYING POWER TO A LOAD.

3,898,567. CRYSTAL-LOCK TUNING SYSTEM FOR TUNING REGULARLY AND IRREGULARLY SPACED CHANNEL FREQUENCIES.

3,898,667. COMPACT FREQUENCY REUSE ANTENNA.

3,898,702. ADJUSTABLE BED.

3,899,371. METHOD OF FORMING PN JUNCTIONS BY LIQUID PHASE EPITAXY.

3,899,635. DUAL MODE DEFLECTION SYNCHRONIZING SYSTEM.

3,899,666. INTEGRAL CORRELATION AND TRANSVERSE EQUALIZATION METHOD AND APPARATUS.

3,900,599. METHOD OF ELECTROLESS PLATING.

3,900,717. APPARATUS FOR SCANNING RAISED INDICIA.

3,900,743. CHARGE AMPLIFIER.

3,901,371. PRINT ACTUATOR ARRANGEMENT AND ENCODER.

3,901,578. ILLUMINATOR EMPLOYING HOLOGRAPHIC TECHNIQUE.

3,901,994. METALLIZED VIDEO DISC HAVING A DIELECTRIC COATING THEREON.

3,902,003. ELECTRICAL DEVICE WITH ELECTRODE CONNECTIONS.

3,902,079. SWITCHING CIRCUIT HAVING MULTIPLE OPERATING MODES.

3,902,188. HIGH FREQUENCY TRANSISTOR.

3,902,190. PROGRAMMABLE TEST OF READ/WRITE CIRCUITRY BY VARING CLIPPING LEVELS.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF SEPTEMBER 13, 1975

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-28-75
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	11-1-74
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	12-20-74
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	11-19-74
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-7-75
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	12-4-74
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	10-4-74
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-2-74
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	2-19-75
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-3-74
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-11-74
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-6-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	1-3-75
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	1-8-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-27-74
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	3-14-75

Expiration of patents: The patents within the range of numbers indicated below expire during October 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents—Numbers 2,854,669 to 2,858,536 inclusive

Plant Patents—Numbers 1,758 to 1,767 inclusive

REISSUES

OCTOBER 21, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

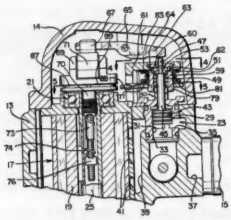
Re. 28,573
SPEED CONTROL AND CUT-OFF DEVICE

John L. Wickham, Glen Arm, Md.; Albert G. Wordsworth, Aurora, Ohio, and David E. Huffaker, Shrewsbury, Pa., assignors to The Black and Decker Manufacturing Company, Towson, Md.

Original No. 3,767,332, dated Oct. 23, 1973, Ser. No. 172,026, Aug. 16, 1971. Application for reissue Dec. 20, 1974, Ser. No. 534,712

Int. Cl.[2] F01C *21/12*; **F04C** *15/02, 29/08*

U.S. Cl. 418—43 **11 Claims**



1. A rotary, fluid pressure operated device comprising a housing, a motor supported within said housing and having a rotor, passage means for delivering pressurized fluid to said motor to rotate said rotor, [a] valve *means* in said passage means and movable *axially* from an open to a closed position, stored energy means associated with said valve *means* and operable to close said valve *means*, latch means normally isolating said stored energy means from said valve means, *said latch means including a member turnably disposed about the axis of said valve means*, centrifugal means normally independent of said latch means and interconnected with said rotor, said centrifugal means being engageable with said latch means upon overspeed of said rotor, whereby to [release] *turn* said latch [means] *member*, whereupon said stored energy means moves said valve means to said closed position.

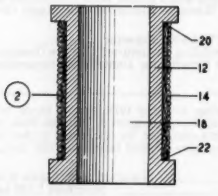
Re. 28,574
FIBER REINFORCED HOT PRESSING MOLDS

Werner H. Ruoff, Berea, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Original No. 3,556,893, dated Jan. 19, 1971, Ser. No. 690,888, Dec. 15, 1967. Application for reissue Dec. 17, 1971, Ser. No. 209,480

Int. Cl. B65h *81/00*

U.S. Cl. 425—78 **12 Claims**



1. A method for reinforcing a refractory mold comprising:

(a) applying a thermosetting carbonaceous binder to at least one side of a flexible textile material selected from the group consisting of carbon yarn, graphite yarn, carbon cloth, graphite cloth, carbon tape and graphite tape, said carbonaceous binder being capable of coking at high temperatures so as to provide a mechanical linkage for the textile materials;

(b) wrapping at least one layer of said textile material substantially around the outside surface of the refractory mold; and

(c) heating said mold, said textile material and said binder to a temperature sufficient to cure and coke said binder.

Re. 28,575
INDICATOR FOR DETECTING HYDROGEN PEROXIDE AND PEROXIDATIVE COMPOUNDS CONTAINING ALPHA NAPHTHOFLAVONE

Robert Bauer, Bristol, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Original No. 3,654,180, dated Apr. 4, 1972, Ser. No. 119,926, Mar. 1, 1971. Application for reissue Apr. 8, 1974, Ser. No. 459,126

Int. Cl.[2] G01N *31/22, 33/16*

U.S. Cl. 252—408 **7 Claims**

1. In a composition for detecting hydrogen peroxide or peroxidative active compounds utilizing the catalytic oxidation of an indicator *system* [dyestuff] by hydrogen peroxide in the presence of the peroxidative active compound, the improvement which comprises the use of α-naphthoflavone *in combination with a water soluble iodide salt* as the indicator *system* [dyestuff]

Re. 28,576
PROCESS FOR RAPID DISSOLVING WATER-SOLUBLE VINYL ADDITION POLYMERS USING WATER-IN-OIL EMULSIONS

Donald R. Anderson, Oswego, and Alvin J. Frisque, La Grange, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Original No. 3,734,873, dated May 22, 1973, Ser. No. 278,329, Aug. 7, 1972. Continuation of Ser. No. 172,946, Aug. 18, 1971, abandoned, which is a continuation-in-part of Ser. No. 92,031, Dec. 15, 1970, Pat. No. 3,624,019. Application for reissue Nov. 9, 1973, Ser. No. 413,848.

Int. Cl.[2] C08F *2/32, 6/14*

U.S. Cl. 260—29.6 H **29 Claims**

1. A method of rapidly dissolving water-soluble vinyl addition polymers into water, which comprises the steps of:

(A) preparing a water-in-oil emulsion which contains dispersed therein [a] *from 5 to 75 percent by weight of* finely-divided water-soluble vinyl addition polymer; [thereby providing a polymer-containing emulsion] *said emulsion having an oil-to-water ratio between 5:1 – 1:10 and said oil being a hydrocarbon liquid*; and then,

(B) inverting said emulsion in water whereby the water-soluble vinyl addition polymer is released into the water as a solution.

14. A method of rapidly dissolving water-soluble vinyl addition polymers into water which comprises inverting in water a water-in-oil emulsion containing from 5 to 75 percent by weight of dispersed finely divided water-soluble vinyl addition polymer, said emulsion having an oil-to-water ratio between 5:1 – 1:10 and said oil being a hydrocarbon liquid.

Re. 28,577

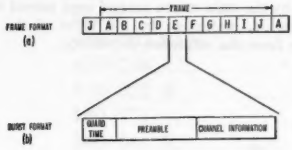
CHANNEL REALLOCATION SYSTEM AND METHOD

William G. Schmidt, Rockville, Md., assignor to Communication Satellite Corporation, Washington, D.C.

Original No. 3,644,678, dated Feb. 22, 1972, Ser. No. 809,340, Mar. 21, 1969. Application for reissue Nov. 21, 1973, Ser. No. 417,837

Int. Cl. H04j 3/16

U.S. Cl. 179—15 BA 6 Claims



1. The method of reallocating channels to multiple stations in a communications system comprising the steps of,

a. establishing a value A for each station, where A_m is the number of channels to be allocated to station m,

b. generating a value σ_i for each station i where

$$\sigma_i[\delta] \sum_{m=1}^{(i-1)} (A_m - B_m)$$

and B_m is the number of channels currently allocated to station m, whereby $|\sigma_1|$ represents the time change of the station i burst necessary to accomplish channel reallocation and the algebraic sign of σ_1 represents the direction of said time change,

c. adjusting the start time of the transmission burst of station i by an amount of time proportional to [σ_i] $|\sigma_i|$ and in a direction dependent upon the sign of σ_1, and

d. wherein m and i are merely subscripts which are related to one another in a manner given in the above equation and are used herein as variables representing stations in the communications system.

Re. 28,578

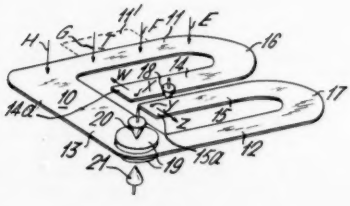
SNAP-ACTING MECHANISMS

Lyndon W. Burch, Boston, Mass., and Hadley K. Burch, Pittsfield, Vt., assignors to B/K Patent Development, Inc., Highland Park, Ill.

Original No. 3,213,228, dated Oct. 19, 1965, Ser. No. 311,194, Sept. 24, 1963. Continuation-in-part of Ser. No. 140,542, Sept. 25, 1961, abandoned. Application for reissue Sept. 28, 1973, Ser. No. 401,708

Int. Cl. H01h 13/36

U.S. Cl. 200—67 DA 22 Claims



1. A snap-acting mechanism comprising an essentially flat sheet of resilient material including a pair of loops having an outer pair of arms and an inner pair of arms, said loops disposed adjacent to one another with their open ends facing in the same general direction, the outer pair of arms of said pair of loops being secured against relative movement away from one another, and means for maintaining the inner pair of arms of said pair of loops in spaced apart relation at a distance greater than an unstressed condition for said sheet *and in a direction edgewise of the arms, transverse to the length thereof and lying in the general plane of the sheet,* thereby to stress said sheet and bias a portion thereof in a direction transverse to the plane of said sheet.

Re. 28,579

INTEGRATING NETWORK USING AT LEAST ONE D-C AMPLIFIER

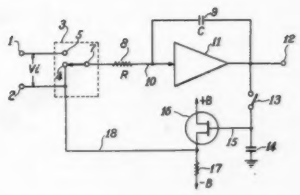
Kozo Uchida, Tokyo, Japan, assignor to Iwasaki Tsushinki Kabushiki Kaisha, Japan

Original No. 3,667,055, dated May 30, 1972, Ser. No. 49,294, June 24, 1970. Application for reissue May 30, 1974, Ser. No. 474,806

Claims priority, application Japan, June 28, 1969, 44-51173; June 28, 1969, 44-51174; May 13, 1970, 45-40037; May 13, 1970, 45-40038; May 13, 1970, 45-40039; May 13, 1970, 45-40040

Int. Cl.² H03K 5/00

U.S. Cl. 328—127 21 Claims



1. An integrating network comprising:

an integrator having an output and having an input for receiving an input voltage signal, and being formed by a first d-c amplifier and time-constant means connected to said first d-c amplifier,

drift memory circuit means connected between the output and input of the integrator for feeding back [in the opposite polarity] the output of the first d-c amplifier to [the] *an* input of the integrator in the absence of an input voltage at an input of the first d-c amplifier so as to obtain a stationary condition and for continuously sending out, as a feedback signal, a voltage fed back to the input of the integrator at the stationary condition, the

feedback signal having a value substantially equal to the drift voltage of the first d-c amplifier converted in terms of the input of the integrator,

whereby an input voltage signal is integrated in the integrator without error caused by the drift of the first d-c amplifier,

level detector means connected to the output of the integrator to produce a first control pulse when the output of the integrator exceeds a predetermined reference level and to produce a second control pulse when the output of the integrator crosses the predetermined reference level in the decreasing direction,

a time measuring means coupled to the level detector for generating a third control pulse in response to the termination of a predetermined first time period measured from the first control pulse and for measuring a second time period between the third control pulse and the second control pulse,

a reference d-c source, and

input switch means connected to said reference d-c source and to the input of the integrator for applying the input voltage signal to the integrator in response to the first control pulse, for applying a reference d-c voltage from the d-c source to the integrator in response to the third control pulse, and for shortening the input of the integrator in response to the second control pulse,

whereby the level of the input voltage signal can be determined by the ratio of the second time period to the first time period, multiplied by the value of the reference voltage from the reference d-c source.

PATENTS

GRANTED OCTOBER 21, 1975

ERRATA

For CLASS	See PATENT NO.
036-002.5AN	3,913,243
423-244	3,913,253
134-022 R	3,913,555
180-121	3,913,704
240-041 R	3,913,872
226-044	3,913,900
339-104	3,914,014
425-387 R	3,914,101
425-392	3,914,102
425-397	3,914,103
425-397	3,914,104
425-435	3,914,105
424-275	3,914,379
426-248	3,914,422
332-030 V	3,914,721

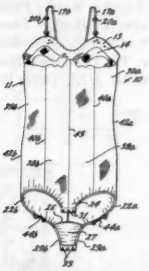
PATENTS

GRANTED OCTOBER 21, 1975

NOTE—A cross reference listing of applications published under Trial Voluntary Protest Program on January 28, 1975 is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

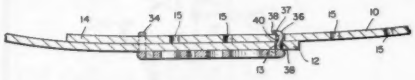
3,913,146
UNDERGARMENT
Itabe I. Zero, 10055 Newville Ave., Downey, Calif. 90240
Filed June 17, 1974, Ser. No. 480,012
Int. Cl.² A41B 9/08
U.S. Cl. 2—78 B **2 Claims**



1. A women's combination undergarment comprising:
a unitary body portion including an upper slip portion and a lower panty portion,
adjustable shoulder straps having elastic connector elements for connecting the ends of said shoulder straps to the back of said slip portion,
said panty portion having curved bottom edges on either front side thereof that converge inwardly to form curved side edges of a short depending front flap having right angular corners on its free end to provide a straight-edged tab portion thereon, and said panty portion having curved bottom edges on either rear side thereof that converge inwardly to form curved side edges of a long depending rear closure flap having right angular corners on its free end to provide a straight-edged tab portion thereon,
an elastic band provided along the curved bottom edges including the curved side edges of the front flap and rear closure flap on either side of said panty portion, and
fastener elements on the straight-edged tab portions of the front flap and rear closure flap,
whereby the rear closure flap is stretchable along its length when the tab portion thereof is extended forwardly beneath the wearer's crotch for fastening by said fastener elements to the tab portion of the front flap while the curved bottom edges including the curved side edges of the front flap and rear closure flap on either side portion of the panty portion is enabled to uniformly yieldingly encircle the thighs of the wearer.

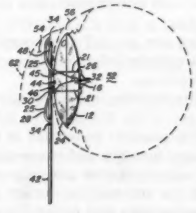
3,913,147
BELT BUCKLE AND BELT STRAP COMBINATION
Robert K. Ostrander, 497 Prospect St., Maplewood, N.J. 07040
Filed May 16, 1974, Ser. No. 470,524
Int. Cl.² A44B 11/22; A41F 3/00
U.S. Cl. 2—325 **1 Claim**

1. A belt and belt buckle combination comprising:
a. a belt strap, having a constant height throughout its length, said belt strap including a first and a second end, said first end having at least one hole extending therethrough, said second end having a plurality of holes extending therethrough;
b. two elongated sides;
c. two shorter sides, said shorter sides joining said elongated sides to form a buckle periphery;
d. a decoration secured to said buckle periphery;
e. a pair of legs mounted to said buckle periphery on the back thereof, extending away from one of said shorter sides, said legs being in vertical alignment and parallel to each other;
f. a cross bar extending between said pair of legs in spaced relationship to said shorter side to form a loop structure defining an enclosed area adapted to receive said first and second ends; and
g. at least one S-shaped hook member secured to the other of said shorter sides extending away from said buckle periphery in the same direction as said pair of legs, said hook member having a first concave portion facing away from said loop structure and a second concave portion



facing towards said loop structure, said first end and said second end extending through said loop structure, said at least one hole in said first end being in registry with at least one of said plurality of holes in said second end said hook member extending through said at least one hole in said first end and said at least one hole in said second end in registry with said at least one hole in said first end, a portion of said first end of said belt strap bearing against said first concave portion of said hook member and a portion of said second end of said belt strap bearing against said second concave portion of said hook member so that said at least one hook member prevents said first and second ends from moving relative to each other, said at least one hole in said first end having a diameter smaller than said first concave portion so that when said hook member is passed through said at least one hole said buckle periphery will be secured to said first end by friction.

3,913,148
INTRAOCULAR LENS APPARATUS
Ernst W. Potthast, 900 Beach Park Blvd., Apt. 150, Foster City, Calif. 94404
Filed Dec. 26, 1974, Ser. No. 536,358
Int. Cl.² A61F 1/16, 1/24, 9/00
U.S. Cl. 3—13 **16 Claims**



1. An intraocular lens apparatus for insertion into a posterior chamber adjacent the iris of an eye, comprising:

a lens having a front face, a central portion and an outer periphery; and

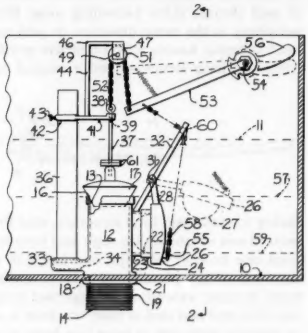
a plurality of cantilevered clips, each mounted to said central portion and extending outwardly from said face and toward said periphery, said clips being adapted to secure the iris to the front face of said lens when said lens is positioned within the posterior chamber of the eye immediately behind the iris.

3,913,149

FLUSH VALVE ASSEMBLY

Rodric E. Brinton, Birmingham, Ala., assignor to G. W. Nicholson, Birmingham, Ala., a part interest

Filed Mar. 28, 1974, Ser. No. 455,577
Int. Cl.² A61B *19/00*; E03D *1/34*, *5/02*
U.S. Cl. 4—67 A **1 Claim**



1. In a flush valve assembly for a water closet tank,

a. an upstanding generally cylindrical member within said tank and having a first inlet at the upper end thereof for receiving water and an outlet at the lower end thereof for discharging water adjacent the bottom of said tank with the bore throughout said upstanding member, including said first inlet, being at least as great as the bore of said outlet,

b. a first valve seat surrounding said first inlet,

c. a first valve member disposed to move selectively to a lower closed position in sealing engagement with said first valve seat and to an upper open position,

d. a laterally disposed inlet for said upstanding member located within said tank at an elevation below said first inlet and adjacent the bottom of said tank with the bore of said laterally disposed inlet being at least as great as the bore of said outlet,

e. a second valve seat surrounding said laterally disposed inlet,

f. a depending flap valve member pivotally supported for movement selectively to a lower closed position in sealing engagement with said second valve seat and to an upper open position,

g. an elongated arm pivotally connected adjacent one end to said tank with the other end thereof being movable in opposite directions,

h. a pulley-like member mounted above said first valve member,

i. a first flexible member connected at one end thereof to said first valve member and connected at the other end thereof to said elongated arm adjacent said other end thereof with the intermediate portion of said first flexible member passing over said pulley-like member,

j. a second flexible member connected at one end thereof to said depending flap valve and connected at the other end thereof to said elongated arm adjacent said other end thereof, and

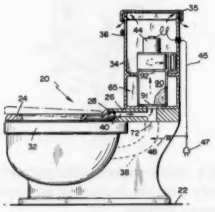
k. a handle member outwardly of said tank and operatively connected to said elongated arm for pivoting said elongated arm in said opposite directions so that downward movement of said other end of said elongated arm opens said first valve member and upward movement of said other end of said elongated arm opens said flap valve so that upon opening said first valve member a minor portion of the contents of said tank is discharged and upon opening said flap valve member a major portion of the contents of said tank is discharged.

3,913,150

TOILET STOOL VENTILATING MEANS

Clarence E. Poister, Topeka, Kans.; Philip A. Tyrrell, Kansas City, Mo., and Walter D. Hodge, Shawnee Mission, Kans., assignors to P K Products/Inc., Wichita, Kans.

Filed Mar. 11, 1974, Ser. No. 449,914
Int. Cl.² A47K *3/22*; E03D *9/04*, *13/00*
U.S. Cl. 4—213 **21 Claims**



1. An improved toilet stool mounted on a supporting surface and including a generally annular conduit seat having an exit aperture and intake openings in communication with the inside of the toilet bowl, said seat circumscribing the upper rim of said toilet bowl when in a lowered position, a tank supported on a rearwardly extending portion of said toilet stool behind said toilet bowl, having a flushing liquid and means connected therein to supply the fluishing liquid to the toilet bowl through a discharge conduit, the improvement being a ventilating means which comprises:

a. an adapter plate situated underneath said tank and having said conduit seat pivotally attached to the rear thereof, being essentially aligned therewith when said seat is in a lowered position, and including a structure defining a conduit which is in fluid communication with said exit aperture of said seat, said seat including a rear protrusion member extending into said adapter plate in proximity to said exit aperture, said conduit of said adapter plate having the outlet thereof substantially spaced from said toilet bowl to one side and opening at a point underneath an end portion of said tank,

b. means for conducting normally contaminated air into the outside atmosphere,

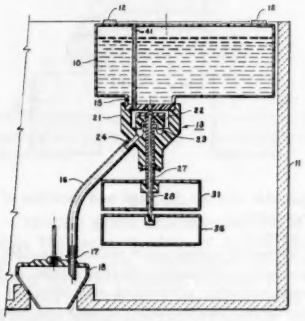
c. means for removing said normally contaminated air from the inside of said toilet bowl through said intake openings, said exit aperture, said conduit of said adapter plate, in order stated, for passing it through said means for conducting into the outside atmosphere, said means for removing being in fluid communication with said means for conducting, and

d. a switch means electrically operably connected to said means for removing, said switch means having a linkage member pivotally lodging within said adapter plate and having a first end in contact with said switch means and a second end removably lodging upon said protrusion member such that pressure exerted on top of said seat causes said linkage member to operate said switch means to activate said means for removing.

3,913,151
APPARATUS FOR DISPENSING METERED QUANTITY OF LIQUID

Russell Edward Keimig, 5 Lawrence Place, Freehold, N.J. 07728

Filed Mar. 18, 1974, Ser. No. 452,779
Int. Cl.² E03D 9/02
U.S. Cl. 4—224 **5 Claims**



1. Apparatus for dispensing a metered quantity of liquid into a toilet bowl or the like, which comprises:

a reservoir for containing said liquid;

means, connected to said reservoir, for supporting said reservoir within the tank of said toilet;

a downwardly extending member fastened to said reservoir and having a first, annular recess formed therein communicating with said reservoir by means of an inlet port;

a downwardly extending first rod passing through a bore in said member;

a first float secured to the lower end of said first rod;

a first washer attached to the other end of said rod, said washer being pressed into sealing engagement with said inlet port when the water level in said tank rises, said first float being actuated by a fall in the level of water in said tank to cause said first rod, and hence said first washer, to admit liquid from said resevoir into said first annular recess; and

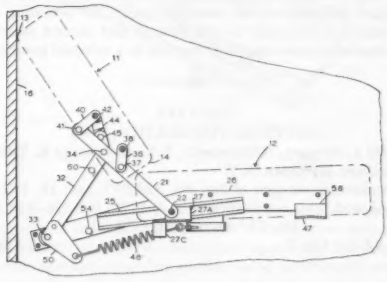
means, actuated by said fall in water level, for inhibiting discharge of the liquid in said recess into a discharge tube communicating with said toilet bowl, said admitting and inhibiting means being actuated, seriatim, by a rising level of water in said tank to first terminate the admission of liquid into said recess and, second, to permit the liquid in said recess to flow into said tube, hence, to said toilet bowl.

3,913,152
CONVERTIBLE SEAT-BED

Howard M. Quakenbush, Monona Village, Wis., assignor to Flexsteel Industries, Inc., Dubuque, Iowa

Filed Oct. 2, 1973, Ser. No. 402,860
Int. Cl.² A47C 17/17
U.S. Cl. 5—37 R **11 Claims**

1. In a convertible seat-bed unit, a generally rectangular back having generally parallel opposite top and bottom edge portions, back support means supporting said back for movement between an inclined position in which said top edge portion thereof is in a first position spaced upwardly and rearwardly with respect to said bottom edge portion thereof and a position in which said top edge portion thereof is in a second position spaced rearwardly from and in horizontal alignment with said bottom edge portion thereof, a generally rectangular seat having generally parallel forward and rearward edge portions, seat support means supporting said seat for movement between a rearward seat position in which said rearward edge portion thereof is disposed below and behind said bottom edge portion of said back when said back is in said first position and a forward bed position in which said rearward edge portion thereof is contiguous to said bottom edge portion of said back with the upper surfaces of said back and seat then being in a common horizontal plane, said back support means being arranged for effecting movement of said top edge portion of said back in a substantially vertical path between said first and second positions thereof, said back support means comprising first arm means, means supporting a portion of said first arm means for generally horizontal movement between a rearward seat position and a forward bed position, second arm means, first pivot means supporting said second arm means for pivotal movement about a first horizontal axis in a fixed position spaced rearwardly from said rearward seat position of said portion of said first arm means, second pivot means interconnecting said first and second arm means for relative pivotal movement about a second horizontal axis spaced upwardly from and in a vertical plane intermediate said first horizontal axis and said rearward seat position of said portion of said first arm means, said second horizontal axis being moved forwardly and downwardly in an arc about said first horizontal axis in response to forward movement of said portion of said first arm means from said rearward seat position to said forward bed position, and means supporting said back from said first and second arm means comprising first linkage means between said back and said first arm means and second linkage means between said back and said second arm means, said first linkage means comprising first link means pivotally connected to said first arm means on a third horizontal pivot axis and pivotally connected to said back means on a fourth horizontal pivot axis and second link means pivotally connected to said first arm means on a fifth horizontal pivot axis and pivotally connected to said back on a sixth horizontal pivot axis, and said second linkage means comprising third link means pivotally connected to said second arm means on a seventh horizontal pivot axis and pivotally connected to said back on an eighth horizontal pivot axis.



3,913,153
ELECTRONIC CONTROLS FOR A HOSPITAL BED

James S. Adams, Batesville, Ind., and William M. Stevens, Loveland, Ohio, assignors to Hill-Rom Company, Inc., Batesville, Ind.

Filed Aug. 9, 1974, Ser. No. 496,211
Int. Cl.³ B60R 21/10; H02P 07/74; A61G 07/10
U.S. Cl. 5—68 **66 Claims**

1. In an adjustable bed of the type having:

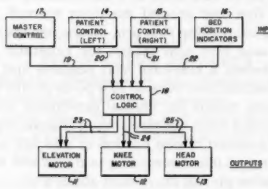
a. a bed portion movable to a plurality of at least three positions, and

b. an electric motor for moving said bed portion from one of said positions to another,

the improvement which comprises:

A. first selection means for selecting between at least two of said positions of said bed portion;

B. second selection means for selecting between at least two of said positions of said bed portion, at least one of said positions selectable by said first selection means not being selectable by said second selection means; and

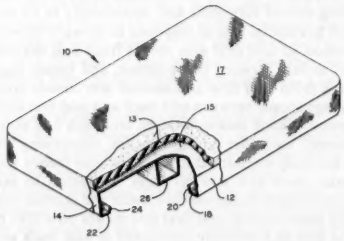


C. logic means coupled between said electric motor and said first and second selection means for actuating said motor in response to said first or said second selection means to move said bed portion to a selected position.

3,913,154
MATTRESS FOUNDATION UNIT

Donald J. Sweeney, Williamsville, N.Y., assignor to R. Thomas McClive, Kenmore, N.Y.

Continuation-in-part of Ser. No. 324,897, Jan. 18, 1973, abandoned. This application Feb. 4, 1974, Ser. No. 439,369
Int. Cl.² A47C *19/00*, *23/00*
U.S. Cl. 5—186 R **2 Claims**

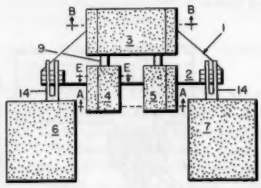


1. A mattress foundation unit comprising a substantially rectangular, unitary corrugated board enclosure member, the enclosure member having a horizontal, continuous top and a pair of sides and a pair of ends formed integrally with the top and depending therefrom to form a continuous vertical skirt around the periphery of the top, the enclosure member also including end and side supports formed integrally respectively with the enclosure ends and sides, the end and side supports being folded inwardly so as to be disposed in spaced, parallel relation to the top, a longitudinally extending independent hollow corrugated board beam member centrally disposed within the enclosure member, a plurality of transversely extending uncut hollow corrugated board beam members disposed within the enclosure member and passing through the longitudinally extending member at substantially right angles thereto, and means to secure the end and side supports to the ends of the longitudinally and transversely extending beams whereby the latter provide internal reinforcement for the enclosure member.

3,913,155
ADJUSTABLE HEAD AND SHOULDER REST

George Daniel Eary, Sr., Rte. 6, Box 264, Hagerstown, Md. 21740

Filed Aug. 26, 1974, Ser. No. 500,723
Int. Cl.² A47C *21/00*
U.S. Cl. 5—327 **4 Claims**



1. An adjustable rest for the head and shoulder of the human body comprising:

a. a base member,

b. a pair of laterally spaced apart resilient shoulder support members having adjustable attaching means, said attaching means rotatably connecting said shoulder support members for movement relative to each other and to said base member, whereby said shoulder members are adjustably spaced from each other and from said base member and adapted to support the shoulders of said human body in a predetermined position,

c. a rotatable face support member having separate interconnected movable members comprising, at least, one for the head, one for the left cheek extending below the chin, and a similar one for the right cheek also extending below the chin,

d. said rotatable face support members being rotatably attached to said base member and spaced longitudinally and generally about equidistant from each of the shoulder members, so that the head and shoulders of said human body is comfortably supported by said face and shoulder support members,

e. said face support members adapted to provide a variation of open areas adaptable to receive the eyes, nose and/or mouth of a human face by adjusting said face support members,

f. said face adjusting attaching means comprising means to raise or lower said face support members and permitting a rotational movement of said face support members about, at least, a transverse axis extending parallel to said base member, and

g. means for varying the lateral distance between said cheek members.

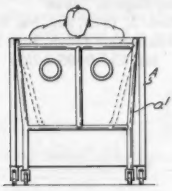
3,913,156
LEVITATION BEDS

Frederick Hugh Howorth, Chorley, England, assignor to Howorth Air Conditioning Limited, Lancaster, England

Filed Mar. 25, 1974, Ser. No. 454,286
Claims priority, application United Kingdom, Apr. 19, 1973, 19131/73
Int. Cl.² A47C *27/08*
U.S. Cl. 5—348 R **6 Claims**

1. In combination, a levitation bed of the type having a pressurized chamber the outlet of which is formed by a plurality of inflatable pockets arranged as a mattress for underlying a patient, means for supplying air under pressure to said chamber and pockets whereby the weight of a patient on the bed may cause escape of pressurized air to establish and maintain in equilibrium a supporting air cushion between the upper surfaces of the pockets and the body of the patient, means including valve means for controlling said supply air pressure, and means responsive to a change of equilibrium air pressure at said cushion due for example to movement of the patient

relative to the pockets for automatically compensatively varying the air pressure derived from said supply for maintaining



substantially constant equilibrium air pressure at said cushion and preventing the patient's body from dropping into contact with said pockets.

3,913,157

SINGLE BUOY MOORING SYSTEM

Jan Versluis, The Hague; Hendrikus S. Rutten, Voorburg, and Gerard Kruisman, Gem. Driebruggen, all of Netherlands, assignors to Shell Oil Company, Houston, Tex.

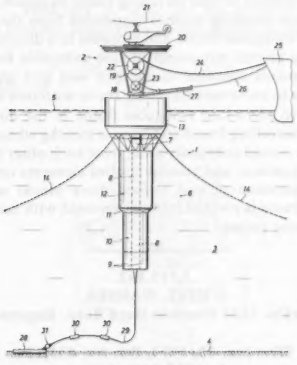
Filed July 17, 1973, Ser. No. 379,955

Claims priority, application United Kingdom, July 18, 1972, 33556/72

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[3] B63b *35/44*

U.S. Cl. 9—8 P **9 Claims**



1. A single buoy mooring system for fluid transfer comprising a slender buoy body of great length, a part on the buoy body which is rotatable around a vertical axis, a first fluid conduit on the buoy body which is adapted to be connected to a pipeline at the bottom of a body of water, a counterweight-actuated hose reel mounted for free rotation about a horizontal axis on the rotatable part of said buoy body above the water, a fluid hose reelable on said hose reel for making a fluid connection between the single buoy mooring system and a ship, a pipe swivel rotatable around a vertical axis for interconnecting the fluid hose and the first fluid conduit, said fluid hose being adapted to be raised out of the water and coiled on the hose reel, a mooring line reel mounted for rotation about a horizontal axis on the rotatable part above the water line, a mooring line adapted to be coiled on the mooring line reel, and at least one counterweight vertically movable within said buoy body for acting simultaneously on the hose reel and on the mooring line reel, said counterweight being of a weight sufficient to actuate said reels and raise the hose and mooring line out of the water.

3,913,158

SWIMMING FINS

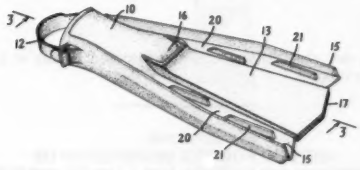
Juan Vilarrubis, Barcelona, Spain, assignor to Nemrod-Metzeler, S.A., Barcelona, Spain

Filed Aug. 12, 1970, Ser. No. 63,062

Claims priority, application Spain, Apr. 8, 1970, 378332

Int. Cl.[2] A63B *31/10*

U.S. Cl. 9—309 **17 Claims**



7. A swimming fin to be worn on the foot of a swimmer comprising a foot-receiving portion, a fin portion extending longitudinally beyond said foot-receiving portion, the free end opposite said foot-receiving portion being substantially wider, an upstanding rib along both edges of the fin portion and on both the upper and lower surfaces of said fin portion, a recessed flow channel adjacent each of the said ribs and a plurality of fins in each flow channel which are spaced apart longitudinally to permit controlled flexing of the fin and laterally offset so as not to be in alignment.

10. A swim fin, which comprises a blade adapted to be employed in propelling a swimmer through the water, means provided at one end of said blade to mount the same to the foot of a swimmer, water-scoop means provided on the top of said blade and directed to receive water in response to downward movement of the foot of said swimmer when said swimmer is in a face-down position, said water-scoop means being disposed relatively adjacent said mounting means, jet-exhaust means provided at the other end of said blade remote from said mounting means, said jet-exhaust means being directed to discharge water in a direction away from said mounting means, and passage means to conduct water from said water-scoop means to said jet-exhaust means for discharge through the latter, said passage means being defined in part by upper and lower walls which extend from said water-scoop means to said other end of said blade and substantially separate the water flowing through said passage means from the water passing along the exterior of said blade.

3,913,159

INFLATABLE FLOAT WITH STEERING MECHANISM

Edward Thomas, Demarest, N.J., assignor to Lawrence Peska Associates, Incorporated, New York, N.Y., a part interest

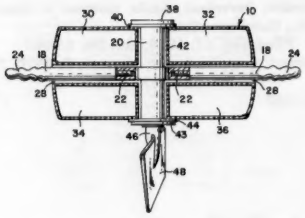
Filed Oct. 15, 1974, Ser. No. 514,439

Int. Cl.[3] B63C *9/08*

U.S. Cl. 9—313 **7 Claims**

1. A steerable float comprising: a buoyant collar dimensioned for engagement with the trunk of an operator below the arm, a journal bearing extending through said collar, a shaft extending through said journal bearing and a pair of arms

extending radially from said shaft, said arms intersecting said shaft within said collar, and extending to the outside of said



collar, said shaft having a rudder disposed fixedly at an extremity thereof.

3,913,160

METHOD FOR THE PRODUCTION OF CUSHIONED-SOLE SHOES AND LAST TO PERFORM THE METHOD

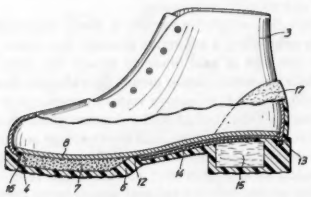
Herbert Funck, Am Wasserbogen 43, 8032 Grafelfing-Lochham, Germany

Filed Mar. 29, 1974, Ser. No. 456,136

Claims priority, application Germany, Apr. 12, 1973, 2318521

Int. Cl.² A43D *9/00*

U.S. Cl. 12—142 R **2 Claims**



1. A method for the production of a shoe, especially a cushioned-sole shoe, comprising the steps of:

mounting an upper to a last having at least one downward extension in the ball region;

attaching an intermediate insole onto the upper in the joint and heel region;

attaching a joint piece to the intermediate insole;

securing a heel filler piece to the joint piece;

inserting the combination of upper, intermediate insole, joint piece, heel filler piece and last into a sole mold;

molding an outsole directly to said upper whereby the intermediate insole, joint piece and heel filler piece are intimately and rigidly surrounded by the outsole material when the outsole is molded;

removing the shoe from said mold;

removing the last from the thus formed shoe; and

inserting a cushion piece into the cavity in the outsole formed by the downward extension of the last.

3,913,161

VEHICLE CLEANING APPARATUS

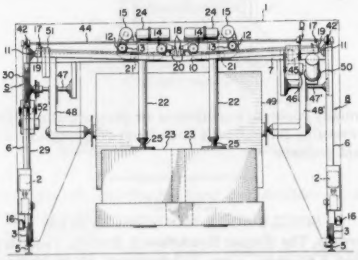
Shigeo Takeuchi, Nagoya, Japan, assignor to Takeuchi Tekko Kabushiki Kaisha, Nagoya, Japan

Filed Nov. 2, 1973, Ser. No. 412,435

Claims priority, application Japan, June 18, 1973, 48-68527

Int. Cl.² B60S *3/06*

U.S. Cl. 15—21 E **11 Claims**



1. A vehicle cleaning apparatus, comprising a portally shaped travelling frame structure adapted to travel over a vehicle to be cleaned in straddling relation thereto and including first drive means for moving said travelling frame structure longitudinally back and forth, a portally shaped swingable frame pivotally connected at the lower portion thereof to said travelling frame structure for forward and backward swinging movement relative thereto, second drive means for pivoting said swingable frame about its pivotal connection, means for defining the limits of the angular pivotal range of said swingable frame relative to said travelling frame structure, a pair of rotatable side cleaning brushes suspended from the top portion of said swingable frame and movable in a direction transverse to the pivotal movement of said swingable frame, first control elements operable to energize said first and second drive means to move said travelling frame structure and at the same time to pivot said swingable frame in the direction in which said travelling frame structure is moving when said side brushes are moved outwardly away from each other to assume their open position, and second control elements operable to stop the operation of said second drive means when said swingable frame is pivoted into engagement with said angular range defining means.

3,913,162

WHEEL WASHER

John C. Parkin, 1654 Fountain Head Road, Hagerstown, Md. 21740

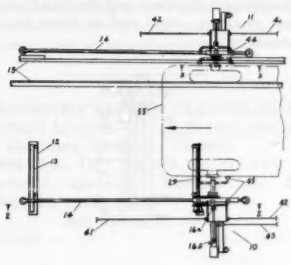
Filed Jan. 10, 1974, Ser. No. 432,134

Int. Cl.² B60S *3/06*

U.S. Cl. 15—21 C **4 Claims**

1. A wheel washing device for washing the wheels of a vehicle as the vehicle is moved along a prescribed path comprising two guide rails positioned on opposite sides of said path of travel in parallel relation thereto, a master carriage mounted on one of said guide rails and having freedom of motion from rearward to forward positions and being normally disposed in said rearward position, a slave carriage mounted on said opposite guide rail and having freedom of motion from rearward to forward positions, a pulley and cable system tying the master and slave carriages together so as to maintain them in a fore and aft relationship directly opposite each other, a roller pivotally mounted on said master carriage for movement about a horizontal axis and having freedom to move vertically along an arc having said axis as its center, said roller projecting into said path of travel of said vehicle in position to be engaged by said wheels to be washed to thereby urge said master carriage along said guide rail from said rearward position to said forward position, said pulley and cable

system simultaneously maintaining the required fore and aft positioning of said slave carriage on said opposing guide rail, a pit located in the path of said roller at the forward most position of said roller's travel and having such size and shape as to accept said roller completely thereby permitting continued forward travel of said wheel over said roller, means for



ejecting said roller from said pit upon release of said roller by said wheel, means for returning said carriages to said rearward positions on said guide rails, means mounted on said carriages for cleaning and scrubbing said wheels during said movement of said carriages from said rearward position to said forwrd position.

3,913,163

DEVICES FOR CLEANING GLASSES AND OTHER DRINKING VESSELS

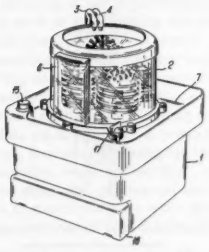
Charles E. Durham, Farnborough, England, assignor to Cleanglass Electric Washer Limited, London, England

Filed Nov. 8, 1973, Ser. No. 413,820

Claims priority, application United Kingdom, Jan. 2, 1973, 219/73

Int. Cl.² A47L *15/38*

U.S. Cl. 15—75 **8 Claims**



1. In a device for cleaning glasses and other drinking vessels, said device including an open-topped container for containing washing liquid, an elongated central brush, means mounting said central brush in an upright position in said container, a plurality of further elongated brushes and means mounting said further brushes in said container in upright positions around said central brush, the improvement comprising a driving mechanism mounted below said container and means operatively connecting said driving mechanism to said brushes for rotating said brushes about upright axes extending longitudinally of said cores, and wherein said central brush comprises an upright longitudinally resiliently compressible core, bristles projecting radially from said core around the periphery and along the length thereof and further bristles projecting upwards from the upper end of said core, and each of said plurality of further brushes comprises an upright resiliently bendable core and bristles projecting from said bendable core around the periphery and along the length thereof.

3,913,164

CURLING BROOM

Joe Semenchuk, 519 Ave. L, P.O. Box 1072, Saskatoon, Saskatchewan, Canada

Continuation-in-part of Ser. No. 338,124, March 5, 1973, abandoned. This application Nov. 18, 1974, Ser. No. 524,853

Claims priority, application Canada, July 28, 1972, 149322

Int. Cl.² A46B *17/04;* **A63B** *67/14*

U.S. Cl. 15—210 R **7 Claims**

1. A broom for use in the game of curling, having a handle and a sweeping head secured to one end of said handle, said head comprising:

a bundle of elongate fibres;

means binding said fibres together to form a bundle comprising a plurality of rows of cord stitching which pass through and around said fibres at the normally upper end of said fibre bundle adjacent to the handle;

means securing said bundle of fibres to said handle; a pouch surrounding only a lower portion of said bundle of fibres remote from said handle but covering at least the lower third of said bundle, said pouch comprising flexible sheet material having smooth non-binding inner and outer surfaces, and extending around the lower end of said fibre bundle to form a pocket in which the fibres are completely surrounded and loosely encased, the sides of the pocket extending toward the handle of the broom over at least one third of the lower portion of said fibre bundle; means holding said pouch on said broom head and preventing said pouch from slipping down said bundle away from said handle; and

a flexible fabric cover applied over said pouch, fibres and bindings, and in direct contact with said smooth non-binding outer surface of said pouch so that the cover can slide freely relative to the pouch, said flexible fabric cover being bound to said broom handle, and providing an outer surface suitable for contact with the ice surface during play of a curling game.

3,913,165

GLASS CLEANING DEVICE

Donald J. Behnk, Allison Park, Pa., assignor to William Hoffman and Morris Goldberg, both of Pittsburgh, Pa.

Filed Dec. 9, 1974, Ser. No. 530,739

Int. Cl.² A47L *15/00;* **B08B** *9/00*

U.S. Cl. 15—244 R **11 Claims**

1. A glass cleaning device comprising:

a base;

an open-top cup-like receptacle secured at its bottom portion to said base;

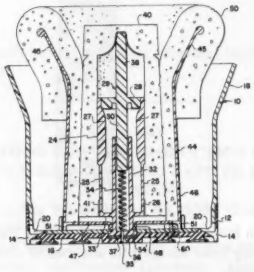
a first upwardly extending, hollow guide member secured in place with respect to said receptacle, the walls of said first guide member being constructed and arranged to flex

outwardly when urged in that direction and to return to its original position when the urging force is removed;

a first hollow sleeve formed of sponge-like material having a closed top and sized to fit snugly around a major portion of said first guide member;

urging means for urging the walls of said first guide member outwardly;

said first guide member, first sleeve, and urging means being so constructed and arranged with respect to each other that when a glass is pushed downwardly on said urging means the walls of said first guide means flex outwardly carrying the first sleeve with it whereby a top portion of the first sleeve enters into the glass while another part of the top portion of the first sleeve contacts the outer edge of the glass and the glass may be rotated to simultaneously clean its inside and edge portions;



a second upwardly extending hollow guide member secured in place with respect to said receptacle and spaced radially outwardly of the first guide member to define an annular space therebetween, the wall of said second guide member being constructed and arranged to flex outwardly when urged in that direction and to return to its original position when the urging force is removed;

a second hollow sleeve formed of a sponge-like material sized to fit snugly within the second guide member and against the outer surface of said first sleeve; and

said second guide member and second sleeve being so constructed and arranged with respect to each other that when a larger glass is placed over said first sleeve the inner portion of the glass is contacted by the outer surface of said first sleeve while the outer portion of the glass is contacted by the inner surface of the second sleeve and the wall of the second guide member is flexed outwardly should the glass being washed be greater in size than the inner diameter of the second guide member.

3,913,166

HEADLIGHT CLEANING ATTACHMENT

James J. Morrison, Windsor, Canada, assignor to Kasle Steel Corporation, Detroit, Mich.

Filed Apr. 17, 1974, Ser. No. 461,525

Int. Cl.² B60S *1/20, 1/44, 1/46*

U.S. Cl. 15—250.01 **5 Claims**

1. A headlamp cleaner adapted to be attached to an automobile to provide a flat easily cleanable surface in lieu of cleaning the conventional curved headlamp surface, comprising:

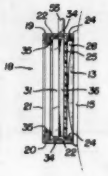
a flat rectangular support frame having top and bottom frame members and vertical side members; said rectangular support frame being mounted entirely exteriorly of said conventional headlamp;

said support frame having a front channel positionable away from the automobile and a rear portion positionable adjacent the automobile headlamps;

said front channel being formed in said top and bottom frame members;

a relatively rigid flat transparent member mounted in said rear portion of said support frame to be spaced away from said headlamp to present a flat, easily cleanable surface;

a sealing ring on the rear portion of said support frame adapted to form an air tight seal between the frame, the flat transparent member and the headlamp surface to prevent moisture, dust, and so forth from collecting therebetween;



a flat rectangular wiper frame having top and bottom frame members and vertical side members slideably mounted in the front channel of said support frame for lateral movement within said support frame;

wiping means mounted on the wiper frame for wiping the front of said flat transparent member; and

actuator means for reciprocally moving said wiper frame in said front channel of said frame to thereby clean the flat transparent member.

3,913,167

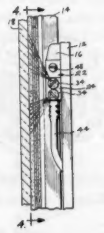
WINDSHIELD WASHER NOZZLE DEVICE

Richard J. Frigon, Michigan City, Ind., assignor to Sprague Devices, Inc., Michigan City, Ind.

Filed July 15, 1974, Ser. No. 488,436

Int. Cl.² B60S *1/52*

U.S. Cl. 15—250.04 **2 Claims**



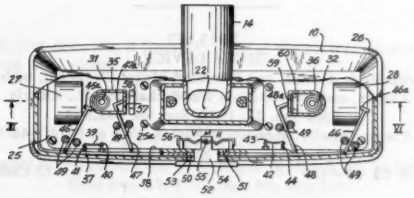
1. A windshield washer and nozzle device adapted for use with a windshield wiper, said windshield wiper including a wiper arm and a wiper blade connected to said wiper arm in contact with said winshield, said wiper arm being reciprocably shiftable over said winshield with said wiper blade moving across the surface of the windshield, said washer and nozzle device comprising a mount having a base and a pair of nipple parts, said nipple parts projecting outwardly from said base in a common direction and along parallel axes, flow passage means extending through said base and nipple parts and having an inlet in the base and an outlet in each nipple part, a flexible conduit having its one end connected to said base at said flow passage means inlet and having its other end adapted for connection into a fluid flow system from a windshield washer fluid reservoir, each nipple part including an end edge and having an annular groove formed about it spaced from its end edge, a cap fitted over each nipple part end edge and covering the flow passage means outlet in the connecting nipple part, each cap including an inturned rib means fitted

within the annular groove in its connecting nipple part wherein each cap is rotatable relative to its connecting nipple part about the axis thereof, directional spray orifice means in each cap in flow communication with the fluid passage means outlet in its connecting nipple part, said base including means wherein said mount is securable to said wiper for movement with said wiper blade, each cap rib means and nipple part annular groove constituting means allowing turning of each cap relative to its connecting nipple part to selectively direct fluid flow through said spray orifice means against said windshield.

3,913,168
MULTI-PURPOSE VACUUM CLEANER NOZZLE

Kjell Ake Vilhelm Lovgren, Spanga, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Nov. 19, 1973, Ser. No. 417,413
Claims priority, application Sweden, Nov. 22, 1972, 15169/72; Sept. 18, 1973, 7312670
Int. Cl.² A47L 9/06
U.S. Cl. 15—319 **14 Claims**



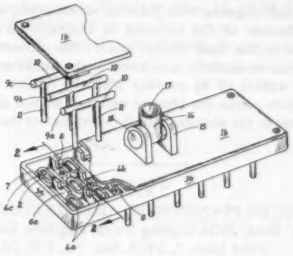
1. In a multi-purpose vacuum cleaner nozzle comprising a housing having a suction channel, a stationary and a movable working member in said housing, said movable working member being adapted to move between upper and lower positions with respect to said housing and comprising a pneumatically operable shifting device dependent upon a source of supply of air at a partial vacuum, said shifting device including a diaphragm operated by the pressure of said partial vacuum and at least partially defining a space communicating with said suction channel, a plate in said housing and provided with at least two spaced abutment structures thereon, said diaphragm supporting said movable working member and said plate, the invention comprising at least one slide movable between two end positions in said housing, a pair of spaced blocking means mounted on said slide, each of said blocking means in one end position of said slide co-acting with a respective one of said abutment structures, the latter blocking the movement of said plate and said movable working member in said one end position, and in the other end position of said slide the latter assumes a position in which the plate is capable of free movement relative to movements of said diaphragm.

3,913,169
RAKE DEVICE

Claude W. Seymour, 8401 Delido Road, Louisville, Ky. 40219

Filed Oct. 26, 1973, Ser. No. 410,289
Int. Cl.² A47L 9/04
U.S. Cl. 15—369 **1 Claim**

1. A rake means including: a base number including a multiplicity of selectively spaced apertures of selected width in one side thereof; a multiplicity of elongate spaced tooth members of substantially equal length having a diameter less than the width of said apertures of said base member; pivot means to pivotably connect selected tooth members to said base member and dispose selected tooth members to extend through said apertures outwardly from one side of said base member, said tooth members being arranged to provide at least two rows of tooth members; said tooth members contacting a surface to be raked to support the base member above the surface to be raked so each tooth member can pivot from a first position contacting one side of its respective said apertures to a second position contacting a second side of said apertures in response to movement of said base member over a surface to be raked; and a vacuum tube member carried by

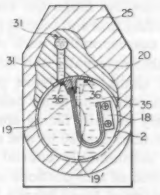


said base member adapted to be connected to a source of suction to remove materials released from said surface by movement of said tooth members over said surface.

3,913,170
DOOR CLOSER

Sunao Nakane, and Kiyoyasu Wake, both of Tokyo, Japan, assignors to Miwa Lock Co., Ltd and Showa Seisakusho Co., both of Tokyo, Japan

Continuation of Ser. No. 373,152, June 25, 1973, abandoned.
This application Jan. 2, 1975, Ser. No. 538,007
Claims priority, application Japan, June 27, 1972, 47-75098
Int. Cl.² E05F 3/14, 3/22
U.S. Cl. 16—58 **5 Claims**



1. In a door closer, a housing having a cylinder formed therein and a piston slidably engaged in the cylinder to reciprocate axially thereof and define first and second chambers therein, means yieldably biasing the piston in one axial direction of the cylinder, means for interconnecting the piston with the door so that during opening of the door said means for interconnecting moves the piston in the other axial direction of the cylinder against the bias thereon, and means for damping the reciprocation of the piston in the one axial direction of the cylinder under the bias thereon when the door is released, including a hydraulic fluid charge in the cylinder, means defining a first fluid flow path and a second fluid flow path between said first and second chambers, check valve means in the first fluid flow path whereby the fluid can flow therethrough only from the second chamber to the first chamber, when the piston is reciprocated in the other axial direction of the cylinder, and throttle valve means in the second fluid flow path whereby the fluid flow from the first chamber to the second chamber is throttled at a variable rate when the piston is reciprocated in the one axial direction of the cylinder, said second fluid flow path including an outlet for the fluid in one wall of said first chamber, said throttle valve means including a bimetallic thermostatic element which is cantilevered into the first chamber from a point within the housing, an arcuate valve closure member, and means slidably

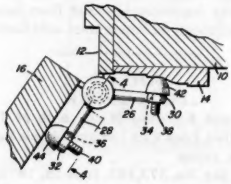
mounting the arcuate valve closure member in the housing adjacent the outlet so that the closure member can slide circumferentially in relation to the outlet and can overlap the outlet to a variable extent, the free end of the bimetallic element being relatively pivotally interconnected with the arcuate value closure member rendering said arcuate valve closure member self-aligning with the wall surrounding said outlet so that deflection of the element in response to temperature variations in the fluid charge causes the closure member to move circumferentially in relation to the outlet and thereby to vary the extent of its overlap with the outlet, but pressure differentials across the closure member do not cause counter deflections in the element which could distort the shape of the element.

3,913,171

DOOR HINGE PIN MOUNTED ADJUSTABLE DOOR STOP

Ernest A. Reid, 2921 Kipling Drive, Augusta, Ga. 30904

Filed Mar. 7, 1975, Ser. No. 556,202
Int. Cl.² E05F 5/02
U.S. Cl. 16—82 **7 Claims**



1. In combination with a hinge construction having a series of axially aligned interdigitated hinge leaf supported hinge barrels provided with aligned bores for receiving an axially insertable and removable hinge pin therethrough, a pair of support arms including first and second pairs of corresponding ends, one pair of corresponding ends of said arms including axially disengageable externally and internally splined transversely extending shank and sleeve portions telescopingly engaged with each other, the other pair of ends of said arms including oppositely laterally facing abutment surface means and a hinge pin member carried by one of said first pair of end portions at least substantially coaxial therewith projecting outwardly of one end of said portions axially removably telescoped into said series of hinge barrels from one end thereof, said shank and sleeve portions being removably telescopingly engageable with each other with said arms disposed in a plurality of predetermined relatively angularly displaced positions.

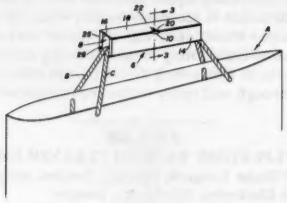
3,913,172

DETACHABLE HAND-GRIP FOR SHOPPING BAGS

George Richards, deceased, late of Lansing, Mich.; by Vivian L. Hadley, 618 N. Foster St., Lansing, Mich. 48912, and by Arlene I. Petrovich, 501 Harriet St., Lansing, Mich. 48915 (sole heirs)

Filed Mar. 27, 1972, Ser. No. 238,471
Int. Cl.² B65D 25/32
U.S. Cl. 16—114 B **2 Claims**

1. As a new article of manufacture, a readily attachable and detachable hand-grip for use in association with rope and equivalent handles on shopping bags and the like comprising an elongate block having a channel opening through one longitudinal edge and also through opposite transverse ends and defining groove means for reception of the bight portion of a rope or an equivalent carrying handle, and a readily openable and closable cover for the main entrance portion of said channel, said cover being in the form of a flat plate, one wall of the channel having an accessible finger niche and an adjacent edge portion of the cover plate having a finger accommodating bend in alignment with said niche, an opposite edge portion of said plate having a keeper hole and the other



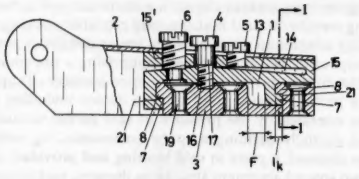
wall of said channel being provided with a projecting pin constituting a keeper, the latter being releasably associable with said keeper hole.

3,913,173

HINGE DEVICE

Erich Rock, Hochst, and Bernhard Mages, Dornbirn, both of Austria, assignors to Blum Gesellschaft m.b.H., Austria

Filed Jan. 22, 1975, Ser. No. 542,903
Claims priority, application Austria, Feb. 6, 1974, 946/74
Int. Cl.² E05D 7/04
U.S. Cl. 16—130 **13 Claims**



1. A hinge device, particularly for mounting a door to a piece of furniture, said device comprising:

a mounting plate adapted to be attached to a piece of furniture, said mounting plate having a pair of lips projecting therefrom in the same direction;

an intermediate part positioned on the top of said mounting plate, said intermediate part having a pair of projections extending in the same direction therefrom, said projections being fitted beneath said lips of said mounting plate;

a hinge arm mounted on said intermediate part; and

said mounting plate having therein means providing a free path of relative movement between said projections and said lips, said free path having a length at least as long as a first of said lips.

3,913,174

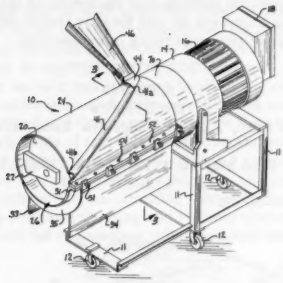
METHOD AND APPARATUS FOR REMOVING SKIN FROM CHICKEN NECKS

Stephen A. Paoli, 520 S. Sixth St., Rockford, Ill. 61108

Filed Oct. 5, 1973, Ser. No. 403,846
Int. Cl. A22b
U.S. Cl. 17—1 G **13 Claims**

1. Apparatus for removing the skin from the neck of a chicken or other fowl and comprising: a fixed housing having a longitudinally-extending channel sized to receive the neck; rotatable; means adjacent the channel for engaging and rotat-

ing the neck and advancing it in one direction along the channel; and means located adjacent the channel for engaging the



skin and removing it from the neck as the neck is advanced along the channel.

3,913,175

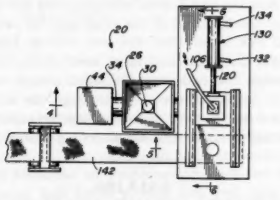
HAMBURGER PATTY FORMING MACHINE

Donald E. Peterson, 7900 S. Le Claire, Burbank, Ill. 60459

Filed Dec. 19, 1973, Ser. No. 426,431

Int. Cl. A22c *7/00*

U.S. Cl. 17—32 **11 Claims**



7. a hamburger patty forming machine comprising:

a hopper adapted to receive and to hold ground meat, and having a meat discharge port,

a mold packing cylinder in communication with said meat discharge port,

drive means and conduit means for transporting ground meat from the port of said hopper to said mold-packing cylinder,

piston means reciprocable in said cylinder,

rod means and means coupling said rod means to said piston means for shifting said piston means axially within said cylinder to force ground meat therethrough and into a mold for filling thereof,

a dish-like mold having an open end in communication with said cylinder for receiving ground meat delivered therefrom,

flexible, pressure-responsive diaphragm means, and means supporting said diaphram means to overlie and to span the open end of said mold,

means for actuating said piston means in said cylinder to discharge ground meat from said cylinder against said diaphragm means to displace said diaphragm means into said mold against bounding walls thereof, thereby to fill said mold with ground meat.

3,913,176

APPARATUS FOR THE DRAFT AND BREAKING OF SYNTHETIC TEXTILE FIBRES

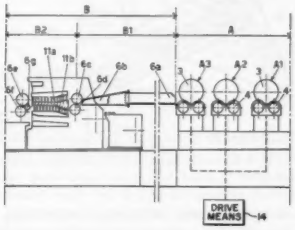
Oscar Grossi, Bologna, Italy, assignor to Tematex S.p.A., Imola, Italy

Filed Nov. 19, 1973, Ser. No. 417,049

Claims priority, application Italy, Nov. 17, 1972, 54113/72; May 30, 1973, 50334/73

Int. Cl.² D01G *1/00*

U.S. Cl. 19—.35 **3 Claims**



1. Apparatus for drafting and breaking synthetic textile fibres which remain unbroken subsequently of passage through a breaking machine comprising:

drafting and breaking means comprising a plurality of serially arranged drafting and breaking groups each group including an upper and two lower rotatable cylinders having parallel axes and arranged substantially perpendicularly to the direction of feeding of a fibre sliver therethrough, said upper cylinder comprising a pressure cylinder and having an elastically deformable substance on the exterior surface thereof, said lower cylinders comprising driving cylinders and having metallic grooves on the exterior surfaces thereof;

feed means for continuously feeding a previously broken fibre sliver to said drafting and breaking means;

driving means associated with said driving cylinders for rotating said driving cylinders of each of said drafting and breaking groups, said driving means including transmission means connected to said driving cylinders for transmitting motion from said driving means to said driving cylinders so that the speed of a successive drafting and breaking group is greater than the speed of the preceding drafting and breaking group;

draft faller means arranged subsequently of said drafting and breaking means for combing and drafting the fibre sliver;

transfer means for receiving the fibre sliver from the last one of said drafting and breaking means and guiding it to said draft gill means, said transfer means comprising a first substantially conical guiding section and a second substantially cylindrical section; and

means arranged subsequently of said draft faller means for collecting the fibre sliver.

3,913,177

APPARATUS FOR DISINTEGRATING FIBROUS MATERIAL AND FOR DELIVERING DISINTEGRATED FIBROUS MATERIAL

Ernst Fehrer, Auf der Gugl 28, Linz, Austria

Filed May 6, 1974, Ser. No. 466,869

Claims priority, application Austria, May 24, 1973, 4519/73

Int. Cl.² D01G *23/00*

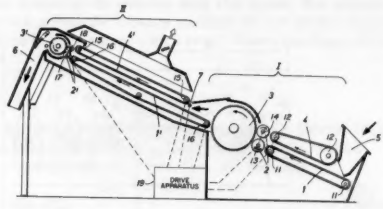
U.S. Cl. 19—96 **4 Claims**

1. Apparatus for disintegrating fibrous material comprising:

a. a first carding unit;

b. a second carding unit, each carding unit including

1. two elongated conveyor belts having respective smooth, longitudinal faces spacedly opposite each other in parrallel relationship,
2. first drive means for driving said belts at a predetermined common velocity of said faces in the same direction from a material receiving to a material discharging area,
3. a pair of feed rollers arranged in said material discharge area for receiving material discharged from by said belts,



4. a carding drum arranged adjacent said feed rollers,
5. second drive means for driving said feed rollers at a surface velocity smaller than said common velocity of said faces and for thereby transferring material discharged by said belts to said carding drum; and

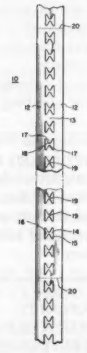
c. charging means for charging the material to be disintegrated to said conveyor belts of said first carding unit,

1. the carding drum of said first carding unit being arranged for discharging material received from the feed rollers of said first carding unit to the belts of said second carding unit.

3,913,178
TIE STRIP

Gene Ballin, Merrick, N.Y., assignor to Betty Ballin, Locust Valley; Jean Cohen and Martin Schulman, both of Great Neck Estates, all of, N.Y.

Filed Jan. 18, 1974, Ser. No. 434,548
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 **7 Claims**

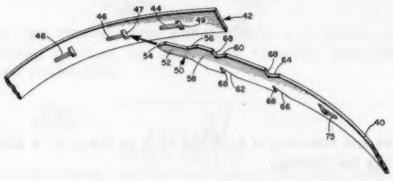


1. A tie strip comprising an elongated pliable resilient strip flexible about its longitudinal medial axis and having longitudinally spaced similar openings formed therein, and at least one flexible resilient tongue registering with each of said openings and projecting longitudinally from an end edge of the respective opening and being integrally formed with said strip, and end edge of said longitudinally spaced openings being generally transverse to the longitudinal axis of said stip, wherein the strip is flexed along its longitudinal axis and passed through one of said openings to form a loop, with the tongue of the openings along the advancing portion of the strip through said one opening sequentially bending the tongue of said one opening, and the tongue of said one opening resisting expansion of said loop by interlocking with the leading edge of the cooperating other opening.

3,913,179
TIE STRAPS

Jhoon Goo Rhee, 2525 N. Ridgeview Road, Arlington, Va. 22207

Filed May 10, 1974, Ser. No. 468,682
Int. Cl.² B65D *63/00*
U.S. Cl. 24—16 PB **3 Claims**

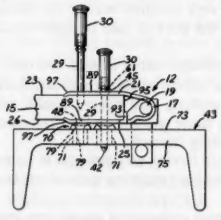


1. An adjustable tie strap comprising a strip of pliable material having a series of T-slots at one end thereof, the other end provided with a tongue portion adapted to be inserted into one of said T-slots, said tongue end portion including a pair of right angled notches adapted to engage said T-slots, an additional T-slot adjacent said notches, said tongue portion having a generally pointed free end and longitudinal, angular, marginal edges which increase in width to the same width as the strap, said notches and T-slots being suitably spaced along the strap so that the free end of the strap may be passed through a T-shaped slot other than the end slot to lock a pair of notches other than the end most notches therein and then passed through the end most T-shaped slot to lock the end most pair of notches therein and through the said additional T-shaped slot and bent so as to position the said pointed free end in abutting contact with the under surface of the tie strap.

3,913,180
RIVETING SYSTEM AND NAIL AND RIVET ASSEMBLY THEREFOR

Winston C. Pray, Lombard, Ill., assignor to Flexible Steel Lacing Company, Downers Grove, Ill.

Filed June 10, 1974, Ser. No. 477,795
Int. Cl.² F16B *13/06*; F16G *3/02*; F16B *35/00*
U.S. Cl. 24—31 B **23 Claims**



1. In a belt fastener system for attaching ends of a belt together, the combination comprising:

belt fastener means comprising an upper element for overlying one side of the belt end and a lower element for underlying the other side of the belt end,

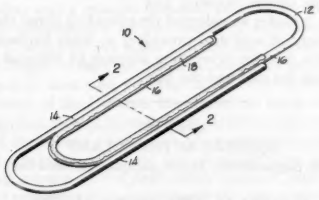
said upper and lower elements each having a plurality of aligned apertures therein,

a plurality of rivets each for insertion through an aperture in said top element and an aligned aperture in said bottom element, each of said rivets having a head at one end for engaging one of said upper or lower elements, a nail secured to the other end of said rivet for penetrating the belt and for guiding the other end of the rivet into the aperture in opposite one of said elements, a first anvil surface on said nail disposed beneath the other end of said rivet for initially deforming and flaring outwardly the other end of said rivet, a support means for supporting the lower elements of said belt fastener means and for receiving and holding said nails therein, and second anvil surfaces on said support means disposed adjacent said first anvil surfaces and co-operating with said first anvil surface by further deforming and bending said other end of said rivets for engagement with said lower element,

3,913,181
PAPER CLIP HAVING A COATED INSIDE LOOP SURFACE

Brooks Walker, 1280 Columbus Ave., San Francisco, Calif. 94133

Filed Nov. 29, 1973, Ser. No. 420,084
Int. Cl.² B42F 1/02
U.S. Cl. 24—67.9 **3 Claims**



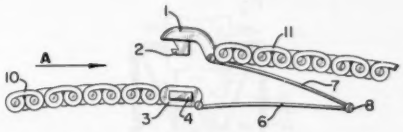
1. A paper clip formed of a single wire bent to have an outer half loop and an internesting inner half loop at one end, a single half loop at the other end and two adjacent straight wire sections extending generally parallel to one another at each side of the paper clip between said opposite ends for forming the gripping elements in combination with the internesting outer and inner half loops at said one end, said paper clip including a coating of non-metallic material for increasing the friction between the clip and the paper disposed on a portion not greater than half of the peripheral surface of that part of the wire which forms the straight wire sections and the internesting outer and inner half loops and wherein the coated portion of the peripheral surface of the inside half loop and straight wire sections is disposed on a side opposite to that of the outside half loop and straight wire sections so as to present opposed coated surfaces effective to grip the opposite sides of the paper inserted between the half loop ends and straight wire sections.

3,913,182
CLASP FOR METAL BRACELETS AND IN PARTICULAR FOR WRIST-WATCH BRACELETS OR STRAPS

Fernando Fontana, Varese, Italy, assignor to Fontana Fernando S.p.A., Varese, Italy

Filed Mar. 18, 1974, Ser. No. 452,377
Claims priority, application Italy, Aug. 28, 1973, 28270/73
Int. Cl.² A43C 11/00; A44B 21/00
U.S. Cl. 24—71 J **4 Claims**

1. A clasp for metal bracelets comprising a first metal body adapted to be fastened to one free end of a metal bracelet, a second metal body adapted to be fastened to an opposite end of the same bracelet, said first body being superposable on the second body to close the clasp, said first body including a hook projecting therefrom, said second body being hollow, a pawl slidingly fitted inside the hollow second body, said pawl being confined within said hollow second body, said pawl including a portion projecting laterally from said second body, and spring means fitted within said hollow body and acting on said pawl to urge the same in a direction so that said portion of the pawl projects laterally from said second body and can serve as a pushbutton which can be depressed by a finger of the user to shift said pawl inwardly against the action of said spring means, said second body having an orifice of a size



sufficient to allow passage of said hook therethrough, said orifice in said pawl being in partial registry with said orifice in said second body such that when said hook is inserted in the orifice in the second body the hook will engage the orifice in said pawl and gradually displace the same against the action of the spring means until said hook is latched with said orifice in the pawl, said pawl being displaceable against the action of said spring means by pressing against said pushbutton to align said orifices and allow removal of said hook from the orifices to separate said metal bodies.

3,913,183
MULTI-ELEMENT GRIPPING DEVICE

George C. Brumlik, 154 Upper Mountain Ave., Montclair, N.J. 07042

Continuation of Ser. No. 200,336, Nov. 19, 1971, and a continuation-in-part of Ser. No. 126,706, March 27, 1971, Ser. No. 126,708, March 27, 1971, and Ser. No. 154,589, June 18, 1971. This application June 28, 1973, Ser. No. 374,711
Int. Cl. A44b 17/00
U.S. Cl. 24—204 **4 Claims**

1. Self-gripping device comprising a multiplicity of upright gripping elements stiffly attached to a base, each of said gripping elements defining a trough having a sharp longitudinal edge along its interior surface, said gripping elements being capable of penetrating and becoming lodged in a receiving material, said gripping elements being wire-like members curved to define said trough, said wire-like members being curved to define said trough being a closed loop attached to said base.

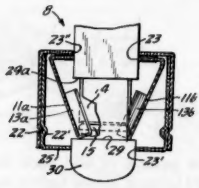
3,913,184
JEWELRY SETTING LOCK-ATTACHING STRUCTURE

Abraham Hanan, P.O. Box 119, Gravesend Sta., Brooklyn, N.Y. 11223

Continuation-in-part of Ser. No. 360,103, May 14, 1973, Pat. No. 3,853,416. This application Oct. 15, 1974, Ser. No. 514,612
Int. Cl.² A44B 19/00; A44C 9/00
U.S. Cl. 24—230 AT **9 Claims**

1. A lock device comprising in combination: an elongated shaft having defined along an elongated axis thereof an indentation slot including at least one substantially upright recessed wall outwardly facing and located above and extending upwardly from an upwardly-stepped-wall face; a shaft-receiving

hole structure means defining a port to an enclosure space receivable of a terminal end of the shaft when inserted therein, with a pair of downwardly-extending substantially upright spaced-apart walls further-defining said enclosure space and with a locking-leg distal end of at least one of the spaced-apart walls being lockably engageable against said upwardly-stepped-wall face preventable of withdrawal of the shaft when inserted through said port into said enclosure space, and an



inwardly movable outwardly-biased key depressible of a distal key end portion thereof into the enclosure space engagingly with and between said pair of spaced-apart walls such that the pair of spaced-apart walls are pressable thereby outwardly from one-another by the key when depressed inwardly to release the shaft when in locked state; and said key, said downwardly-extending spaced-apart walls, and said port being of a unitary structure, said key being a downwardly-extending key-flange.

3,913,185

EASY-ON FISH HOOK CLIP

Newell E. James, 133 Urban Road, Monticello, Wis. 53570

Filed Oct. 18, 1973, Ser. No. 398,758

Int. Cl.² A44B *13/02*; A01K *85/00*

U.S. Cl. 24—237 **1 Claim**

1. An easy-on fish hook and lure clip of the weedless type comprising a continuous length of spring steel wire bent in to touch in such a manner as to present the appearance of a figure eight having a small upper narrow loop adapted to receive a fishing line and facilitate tying of said line thereto and a large wider lower loop adapted to receive a fish lure in such a manner so as to allow the lure to work freely from side to side to attract a fish, the free ends of the clip being of generally V-shape and each forming an upper narrow loop which upper loops are superimposed so as to lie in generally the plane of the large wider lower loop, the upper loops being adapted to be sprung apart to receive an eye of a lure over one said free end so that it can be slid down the wire past the normally touching portions of the wire so as to be retained in the wider lower loop, the fishing line being adapted to be attached to the upper narrow loop by pushing a portion of the line through the top end of the clip between the planes formed by the free ends of the clip, wrapping the line several times around the upper narrow loop and then pushing the loops of line so formed off the upper loop of wire up over the top of the clip and pulling the line tight to form a no slip knot.

3,913,186

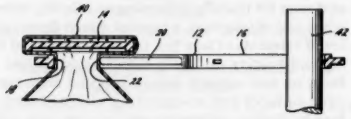
PLASTIC TIE DOWN CLIP

Clarence R. Ray, Porter, and Jack A. La Brie, Houston, both of Tex., assignors to Van Leer Plastics (U.S.A.) Inc., Houston, Tex.

Filed Mar. 4, 1974, Ser. No. 447,647

Int. Cl.² A44B *21/00*

U.S. Cl. 24—245 R **2 Claims**



1. A plastic tie down clip for fastening to a sheet of material comprising,

a plastic body having a large internal opening at one end, and a smaller internal opening at the second end,

a tapered slot interconnecting said openings, the slot decreasing in size from the large opening toward the smaller opening,

the intersection of the slot and the smaller opening providing sharp locking shoulders facing the smaller opening,

a disc having an irregularly shaped periphery for preventing slippage between the material and the disc, said disc sized to be inserted through the large opening, but sized larger than the smaller opening, and

said disc includes an enlarged rib extending about the outer periphery of said disc providing an edge surface wider than the disc for preventing slippage of material placed between the disc and the body.

3,913,187

SQUEEZE-ACTION CLAMP

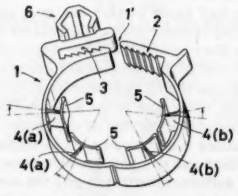
Seizi Okuda, Sagamihara, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Oct. 15, 1974, Ser. No. 514,727

Claims priority, application Japan, Oct. 18, 1973, 48-120222

Int. Cl.² A44B *21/00*

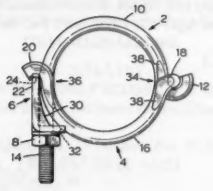
U.S. Cl. 24—255 **2 Claims**



1. In a squeeze-action clamp for squeezing a complementary object therein comprising an integrally formed annular body having two semicircular halves resiliently hinged together at one end, and complementary fastener portions formed at the free ends of each of said semicircular halves adapted to lockingly cooperate when the annular body is collapsed, a plurality of integral flexible clamping members provided on the inner surfaces of each of said halves, said integral flexible clamping members each providing a clamping surface portion spaced from the inner surface of each of said halves by a flexible supporting leg; said legs are inclined relative to a radial line passing through their paint of support with said clamping surface portion which provides a broad latitude a to the size of objects to be resiliently embraced thus giving said legs a directional bias whereby upon insertion of a complementary object between said semicircular halves and lock-

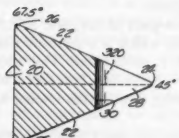
ing of said complementary fastener portions the clamp resiliently squeezes the object within said annular body.

3,913,188
PIPE CLAMP
Arturo Grassi, 2553 Drew Road, Mississauga, Ontario, Canada
Filed Nov. 20, 1974, Ser. No. 525,473
Int. Cl.² B65D 63/00
U.S. Cl. 24—276 2 Claims



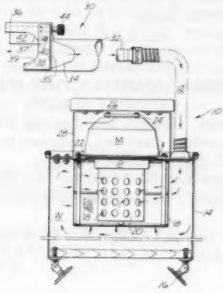
1. A pipe clamp having a first clamp member comprising a length of wire formed substantially into a semicircle, the wire having a reverse bend at one end forming a loop and having at its other end a straight threaded portion, a second clamp member comprising a further length of wire formed into a narrow U-shape in one plane and formed, in a second plane at right angles to the first plane, substantially as a semicircle with reverse bent end portions at the free ends and bight respectively of the U-shape, the semicircle being of the same radius as that formed by the clamp member, said reverse bent bight of the second clamp member passing through the loop formed at said one end of the first clamp member, a nut on the threaded portion of the first clamp member, and a locating member engagable with said nut and with the reverse bent free ends of the wire forming the second clamp member when said threaded portion is situated between said free ends.

3,913,189
FELTING NEEDLE WITH BARB ON A SINGLE EDGE AND AN ISOSCELES BLADE
Edson P. Foster, 409 S. 29th St., Manitowoc, Wis. 54220
Filed Jan. 6, 1975, Ser. No. 538,649
Int. Cl.² D04H 18/00
U.S. Cl. 28—4 N 9 Claims



1. A felting needle blade portion of substantially isosceles triangular cross-sectional configuration, comprising only one longitudinally extending ridge formed by bilaterally symmetrical major side walls converging laterally at an apex and being interconnected at their edges by the base of said triangular blade portion, the major altitude of said triangle being at least 20% greater than said base, and a throat and barb formed only in said longitudinally extending ridge of said major altitude.

3,913,190
SPINDLE WHIRL CLEANER
Richard J. Savageau, Seneca; Earl C. Clevenger, and Gordon C. Anderson, both of Clemson, all of S.C., assignors to Saco-Lowell Corporation, Easley, S.C.
Filed Sept. 10, 1973, Ser. No. 395,889
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² D03D 45/58
U.S. Cl. 28—19 25 Claims



1. In a spindle whirl cleaner for the removal of underwound wraps of yarn from a rotating spindle assembly of a textile yarn processing machine, comprising in combination, a wheeled stool with a seat at its top and wheels at its bottom, a housing fixed therebetween containing a motor interconnected with a power source therefor, a vacuum air pump operatively interconnected with said motor for operation thereof, a yarn collection screen enclosing the air inlet of said pump and a flexible hose fixed externally to said housing and operatively associated with the external surfaces of said screen and said pump inlet, and a vacuum air inlet nozzle for said removal,, the improvement comprising:

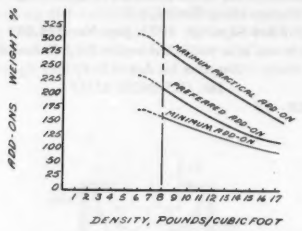
a vacuum air inlet nozzle interconnectable at one end to said hose, said nozzle having a substantially rectangular cross-section at its other end which forms a mouth opening, said other end being formed with flat opposing side walls having arcuate ends to receive therein said rotating spindle whirl, and said opposing walls being joined by a side wall having fixed thereto, adjacent said mouth opening, a member formed of an abrasive, non-metallic material for abutment with said yarn wraps and whirl.

3,913,191
FLUID AID FOR NEEDLING
Alexander M. Smith, II, Elkin, N.C., assignor to The Fiberwoven Corporation, Elkin, N.C.
Continuation-in-part of Ser. No. 221,614, Jan. 28, 1972, Pat. No. 3,817,820. This application Oct. 3, 1973, Ser. No. 403,058
Int. Cl.² D04H 18/00
U.S. Cl. 28—72.2 R 39 Claims

1. A method for producing a highly needled textile fabric comprising:

1. first needling a textile fabric;
2. treating the needled fabric with a soaking amount of a wetting needling fluid and until add-ons of at least 100% are obtained; and

3. further needling the treated fabric while maintaining the soaking amount and the at least 100% add-ons of the



wetting needling fluid to increase the overall bulk density of the needled fabric.

3,913,192
DEVICE FOR CLAMPING A THIN-WALLED TOOL SPINDLE SLEEVE

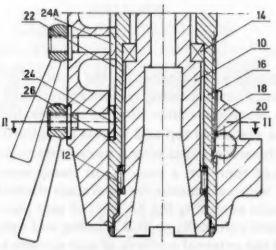
Michael Baumer, Munich, and Ludwig Baumgartner, Neugermering, both of Germany, assignors to Friedrich Deckel Aktiengesellschaft, Munich, Germany

Filed July 24, 1973, Ser. No. 382,179

Claims priority, application Germany, Aug. 3, 1972, 2238287

Int. Cl.² B23Q 1/28; B23C 9/00

U.S. Cl. 29—1 A **7 Claims**



1. A clamping device, comprising:

a stationary spindle housing having an opening therethrough;

an axially movable, thin-walled tool spindle sleeve mounted for axial movement relative to said opening, said opening having a close tolerance fit around said tool spindle sleeve;

means defining at least one axially extending elongated groove on the periphery of said tool spindle sleeve, said groove having at least a pair of substantially circumferentially facing, separate and opposed side surfaces, said tool spindle sleeve being made of a radially expansible material facilitating a slight amount of radial expansion upon application of a circumferential force to said circumferentially facing side surfaces of said groove;

means defining at least one shoe received in said elongated groove, said shoe having a pair of oppositely facing side surfaces both having a contour corresponding to the contour of said circumferentially facing side surfaces and acting to simultaneously frictionally engage said pair of opposed and separate side surfaces of said groove; and

adjusting means for moving said oppositely facing side surfaces of said shoe into and out of frictional engagement with said opposed side surfaces of said groove to effect said slight radial expansion of said tool spindle sleeve, said frictional engagement being caused by a component of force acting at least in a circumferential direction relative to said tool spindle sleeve whereby said tool spindle sleeve is maintained in a fixed position within said opening by a combination of the frictional engagement between said side surfaces of said groove and said shoe and the frictional engagement between the outer diameter of said tool spindle sleeve and the internal surface of said opening after radial expansion of said tool spindle sleeve.

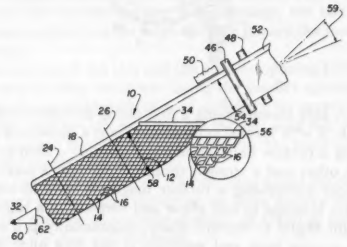
3,913,193
TECHNIQUE FOR THE CONTINUOUS PRODUCTION OF AN EXPANDED METAL STRIP

Domenic Borello, 142 Nyack Ave., Pelham, N.Y. 10803

Filed Apr. 17, 1974, Ser. No. 461,615

Int. Cl.² B21D 31/02

U.S. Cl. 29—6.2 **1 Claim**



1. A method of producing an expanded metal strip comprising the steps of guiding an elongated metal strip along a feed path with a guide means positioned adjacent said feed path in guiding relation to a guided edge of said strip, progressively producing sheared slits in said strip starting at a location adjacent said other unrestrained edge of said strip, said slits being spaced a select distance from and defining a solid border along said guided strip edge and being oriented at an angle of 20° to said feed path, and simultaneously with the production of each angularly oriented slit in said strip pushing open the same to provide said expanded construction to said strip, said direction of pushing being toward said unrestrained edge of said strip whereby said strip is simultaneously sheared and expanded only in a portion of the width of said strip.

3,913,194
METHOD OF ASSEMBLING CATHODE RAY TUBES

Anthony Victor DeVere Krause, 3 Beechcroft, Ashtead, Surrey, England

Continuation-in-part of Ser. No. 377,778, July 9, 1973, Pat. No. 3,875,452, which is a continuation of Ser. No. 123,279, March 11, 1971, abandoned. This application Mar. 4, 1974, Ser. No. 447,774

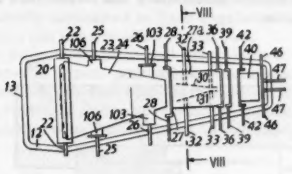
Claims priority, application United Kingdom, Mar. 2, 1973, 10247/73

Int. Cl.² H01J 9/18

U.S. Cl. 29—25.16 **21 Claims**

1. A method of assembling a cathode ray display tube which includes a plurality of electrodes forming an electron gun assembly, the electrodes being each provided with supporting wires by which they are supported from the envelope wall of the tube and located with respect to one another in the finished tube, comprising the steps of assembling the electrodes in their correct relative disposition on a temporary support frame by means of said supporting wires to form a temporary assembly of the electron gun, assembling the envelope of the tube around the electrodes in a plurality of portions with the supporting wires each passing through a seam between those

portions sealing the envelope portions to each other and the supporting wires of the electrodes, and with the temporary



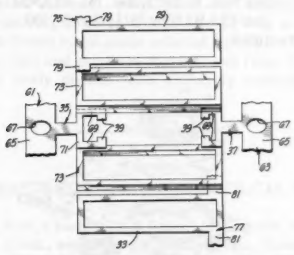
support frame lying outside the envelope, and then removing the temporary frame from the supporting wires.

3,913,195

METHOD OF MAKING PIEZOELECTRIC DEVICES

William D. Beaver, 25951 Serenata Drive, Mission Viejo, Calif. 94590

Filed May 28, 1974, Ser. No. 473,667
Int. Cl.² H01L *41/22*
U.S. Cl. 29—25.35 **16 Claims**



1. A method of making piezoelectric devices comprising:

providing a carrier-body section assembly including a carrier and a plurality of body sections attached to said carrier whereby the body sections can be carried as a unit by said carrier and with each of said body sections including a set of terminals;

providing a plurality of piezoelectric elements each of which includes a piezoelectric crystal blank;

attaching one of said piezoelectric elements to each of said body sections with the set of terminals of each of said body sections being electrically coupled to the associated piezoelectric element;

adjusting the frequency of the piezoelectric elements subsequent to said step of attaching;

removing the body sections with the attached piezoelectric elements from said carrier subsequent to at least a portion of said step of frequency adjusting to thereby provide a plurality of the piezoelectric devices;

said carrier including a conductive carrier strip and

interrupting said conductive carrier strip intermediate adjacent piezoelectric elements prior to adjusting the frequency and retaining the body sections together as a unit subsequent to said step of interrupting.

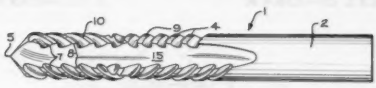
3,913,196

ROTARY CUTTING TOOL

Arthur E. Maday, Bay City, Mich., assignor to Lear Siegler, Inc., Bridgeport, Mich.

Filed Aug. 29, 1974, Ser. No. 501,777
Int. Cl.² B26D *1/12*
U.S. Cl. 29—103 A **12 Claims**

1. A rotary cutting tool comprising a cylindrical body having opposite ends; a first group of cutting edges formed on and extending helically about said body in a direction from one end of said body toward its other end, said cutting edges being spaced by grooves and all of the cutting edges of said first group terminating at a zone short of said other end of said body; and a second group of cutting edges formed on and extending helically about said body in a direction from said other end toward said one end, said cutting edges of said second group being spaced by grooves and all of the cutting



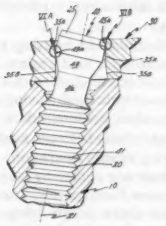
edges of said second group terminating at said zone and confronting the cutting edges of said first group, said groups of cutting edges being formed on helices of opposite hand, each of the cutting edges of said first group terminating short of intersection with a cutting edge of said second group, whereby the confronting ends of the cutting edges of said groups are spaced by a gap at said zone, said gap spiraling about said body at said zone.

3,913,197

POSITIVE LOCK INSERT

Heinz K. Wolf, 36990 Chardon Road, Willoughby Hills, Ohio 44048

Filed Nov. 19, 1973, Ser. No. 417,071
Int. Cl.² B26D *1/12*; B23C *5/22*
U.S. Cl. 29—105 R **8 Claims**

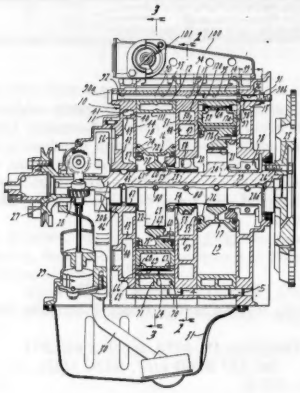


1. In a locking apparatus for locking cutting inserts onto a tool body, the body having a bed on which the insert is adapted to be positioned, one or more locating abutments adjacent the bed against which the insert is abutted to locate it in cutting position, and a tapped hole extending into said body at an angle from said bed toward the general plane of said locating abutment, the improvement comprising said insert including a central aperture at least a portion of said aperture being frusto conical such that when said insert is positioned on said bed the exposed portion of said aperture converges toward said bed, a locking screw having a threaded shank receivable in said hole and a head, said head having a lower section which flares outwardly from said shank and an upper section which converges inwardly toward the top of said screw, the diameter of said aperture at its narrowest point being greater than the diameter of said head at its widest point, said insert being forced into contact with said abutment and said bed with portions of said insert in contact with both said upper and lower sections of said head, and said lower section of said head engaging and overlying said exposed portion of said aperture adjacent said abutment and said upper section of said head engaging and overlying said exposed portion of said aperture remote from said abutment when said locking screw is tightened with said insert on said bed to positively lock said insert in position preventing physical removal of said insert without loosening said locking screw.

3,913,198
ALIGNMENT OF THE MAJOR HOUSINGS IN A WANKEL ROTARY ENGINE

Robert P. Ernest, Dearborn Heights; Daniel C. Ahrns, Westland; Thomas E. Crowley, Livonia, and Edwin J. Ounsted, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 1, 1974, Ser. No. 484,902
Int. Cl.² B23P 15/00
U.S. Cl. 29—156.4 R 15 Claims



1. A method of fabricating a rotary internal combustion engine, comprising:

a. preparing self-contained housing elements and at least one rotor assembly for said engine,

b. providing an eccentric shaft with at least one eccentric thereon, said eccentric shaft having an oil passage system effective to conduct pressurized oil to maintain a predetermined concentricity between said crankshaft, housings and rotor during engine operation,

c. providing at least one centering member for securing said crankshaft in one fixed position and provide a pedestal having at least three points lying in a common plane perpendicular to the axis of said crankshaft,

d. impaling said housing elements and at least said one rotor assembly about said eccentric shaft and onto said pedestal in proper stacked order to define one or more predetermined engine chambers,

e. introducing a supply of high pressure air into said oil passage system for biasing adjacent surfaces on said eccentric shaft, housing and rotor into a predetermined aligned position about said eccentric shaft, and

f. securing said housing elements and rotor assembly in said biased position by employing means effective to exert a compression force to said stacked elements.

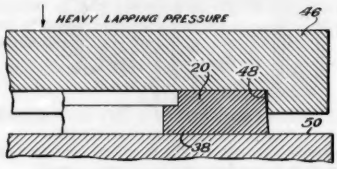
3,913,199
RING MANUFACTURE, PRODUCTIVE OF FACE CONTACT SEAL

Norman M. Packard, Des Plaines, and John W. Gaines, Wheaton, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed June 24, 1974, Ser. No. 482,309
Int. Cl.² B23P 15/06
U.S. Cl. 29—156.6 5 Claims

1. In a method of manufacturing a split torsion ring for engines which, when the ring is in radially collapsed state conforming to a cylinder bore size for which the ring is nominally desinged, torsionally twists as it becomes closed or substantially so, and which presents a generally frusto conical side operable as a radial face seal, the steps of:

lap treatment of the frusto conical side of the ring upon a flat lap surface while applying pressures untwisting the ring against the surface into a distorted collapsed state, deflected toward substantially flat face-to-face contact therewith; and

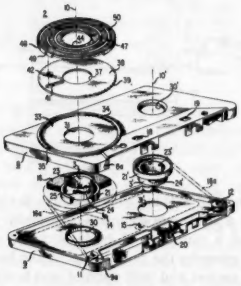


relief of said pressures, relaxing said ring whereby said side seeks its own plane, substantially flattened out while in free spring state.

3,913,200
TAPE CASSETTE INDEX SYSTEM

Albert A. Kossor, 13 N. 12th St., Kenilworth, N.J. 07033

Filed Nov. 8, 1973, Ser. No. 413,931
Int. Cl.² B23Q 17/02; G09F 9/00
U.S. Cl. 29—469.5 17 Claims



1. In a system comprising at least one reel mounted in fixed axial relation in a housing, and constructed in response to driving means to rotate in one direction or the other for rolling up or unrolling a length of tape, said reel provided with a hub, an indexing system for indicating the precise position of information recorded on the said tape,

said indexing system comprising:

a fixed rim integral with a face of said housing, substantially concentric with said reel and having a central opening at least large enough to accommodate the hub of said reel, an annular disk rotatably accommodated within said rim and constructed for slight lateral movement relative to the axis of said rim, said disk having a circular central opening slightly larger than the outer diameter of said hub and an outer periphery of slightly smaller diameter than the inner diameter of said fixed rim,

resilient bearing means coupled in fixed relation to said hub and constructed to bear against the central opening of said annular disk and to move slidably therearound in response to rotation of said hub about its longitudinal axis, said resilient bearing means constructed to cause the outer periphery of said disk to rotate oppositely in progressively meshed relation against an interior surface of said fixed rim,

said annular disk having a radial slot,

indicator means comprising a body portion and a projection substantially normal to said body portion,

the body portion of said indicator means constructed to move slidably in said slot upon rotation of said disk,

an indicator face disposed in a plane substantially parallel to the plane of said fixed rim and constructed to be frictionally maintained in fixed angular relationship to said fixed rim upon rotation of said disk,

said projection constrained upon rotation of said disk to move in a spiral path adjacent a major under surface of said indicator face whereby the position of said projection is visible on said indicator face to indicate the degree of rotation of said disk relative to said fixed rim.

3,913,201
BONDED MATERIAL FOR ELECTRICAL CONTACT PIECES

Horst Schreiner, Nuremberg, and Rudolf Scherbaum, Regensburg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

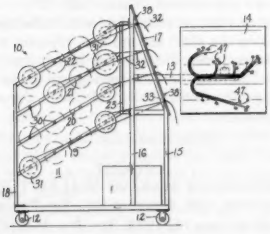
Continuation-in-part of Ser. No. 839,050, July 3, 1969, abandoned. This application June 1, 1973, Ser. No. 365,842
Claims priority, application Germany, July 5, 1968, 1758610
Int. Cl.² B22F *1/00*; H01B *1/02*
U.S. Cl. 29—182.5 **1 Claim**

1. Bonded material, particularly for electrical contact pieces, consisting of silver, from 0.5 to 20% by weight of one finely distributed metal oxide selected from CdO, SnO_2, ZnO, MgO and NiO and mixtures thereof, and from 3 to 15% by weight of finely divided lead uniformly embedded in said silver.

3,913,202
APPARATUS FOR MAKING ELECTRICAL WIRING HARNESSES

Wayne E. Pyle, Cheshire, and Robert J. Doucette, Wallingford, both of Conn., assignors to Questech, Inc., Hamden, Conn.

Filed Aug. 10, 1973, Ser. No. 387,497
Int. Cl.² H05K *13/06*
U.S. Cl. 29—203 MW **15 Claims**

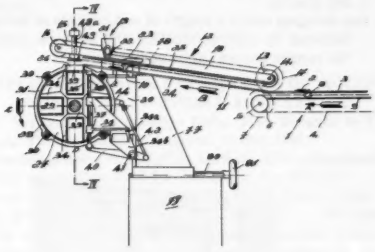


1. Apparatus for assembling wire harnesses, comprising a board, a plurality of wire receptacles mounted to said board in a predetermined arrangement to signify beginning and ending terminal points for a plurality of wire runs, said receptacles adapted to receive and hold one or more wires therein, each of said receptacles including a light emissive device and a switch in circuit therewith, said switch being normally closed but responsive to placement of a wire in said receptacle to open.

3,913,203
APPARATUS FOR FORMING GROUPS OF FLAT OBJECTS

Mario Gardini, and Roberto Tabaroni, both of Bologna, Italy, assignors to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A., Bologna, Italy

Filed May 6, 1974, Ser. No. 467,526
Claims priority, application Italy, May 9, 1973, 3399/73
Int. Cl.² B23Q *7/10*
U.S. Cl. 29—211 R **3 Claims**



1. Apparatus for forming groups of flat objects which are transferred individually from a transfer conveyor, comprising a drum of horizontal axis consisting of a cylindrical wall provided with an upper aperture, and two parallel plates provided with opposing apertures disposed in diametrical positions at right angles to the upper aperture, a shaft driven with intermittent motion and supported coaxially to said drum, a plurality of seats angularly distributed on said shaft and disposed between said plates, said seats opening radially outwards and axially towards the plates in such a manner that at each angular movement of the shaft, said seats are accessible through the upper aperture of the cylindrical wall and the opposing apertures of the plates, a support tray for the objects acting as a mobile base for the seat accessible through the upper aperture, said tray being made to descend in steps equal to the thickness of the objects from a position close to the upper aperture of the cylindrical wall to a position close to the support shaft for the seats, and push means driven parallel to said shaft and penetrating through the opposing apertures of the plates for expelling the objects from the seat aligned with said apertures during pauses in the rotation of the drum, said tray and said push means being controlled by a counter which measures the number of objects introduced through the upper aperture.

3,913,204
GUIDE ROD FOR FEEDING CURTAIN SUSPENDERS INTO POSITION

Rudolf Finkbeiner, Niederstetten, Germany

Filed Apr. 26, 1973, Ser. No. 354,889
Claims priority, application Germany, Nov. 2, 1972, 2253600
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B23P *19/04*
U.S. Cl. 29—241 **31 Claims**

1. A guide rod for introducing curtain suspenders into a gate in curtain rails of the internal track type, said rod having

a straight portion with a runner groove externally accessible by a longitudinally extending slot,

a runner charging rod having a handle and a forward end reciprocatable in the runner groove,

a curved portion including an extension of the runner groove,

a stiffening rib in the curved portion which is centrally positioned, is substantially narrower than the runner groove slot of the internal track curtain rail into which the

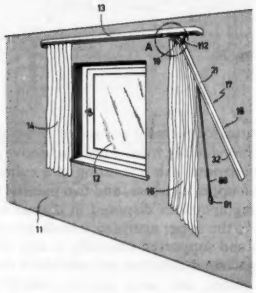
suspenders are to be introduced and is insertable therein for the purpose of lateral guidance and longitudinal alignment,

a guide surface at each side of the stiffening rib at the upper part of the end region of the curved portion, and

two tongues, one at each side of the runner groove slot projecting as an extension of the curved portion from the underneath part of said end region, wherein

the straight portion of the rod consists of a run of box section curtain rail capable of being mass-produced and having reinforcement elements at either side of the runner groove,

the charging rod is a length of rod capable of being manufactured by mass-production and situated externally of the runner groove in the rod,



the end of the charging rod remote from its handle is connected by connecting means with a curtain suspender pushing member situated inside the runner groove of the rod and is reciprocatable therein, the connecting means penetrating the slot in the runner groove in the rod,

the curved portion of the rod is rigidly secured as a die cast component upon the end of the straight portion of the rod,

the two tongues extend in a position in which they engage the base of the runner groove in said gate in the curtain rail, whilst the upper surfaces of the tongues are situated below the running surface of the runner groove base of the curved portion of the rod, and

the stiffening rib is provided with an extension which extends beyond the surface supporting it and has a shape such that when in operation it bears upon the upper side of the gate when the latter is in the open position.

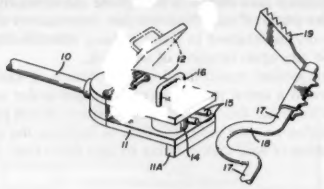
3,913,205

TOOL FOR INSERTING DEVICES HOLDING SIDE BOARDS IN INGOT MOLDS

James B. La Bate, Chippewa Park Road, Beaver Falls, Pa. 15010

Filed Jan. 21, 1974, Ser. No. 435,834
Int. Cl.² B25B *27/14*
U.S. Cl. 29—278 **2 Claims**

1. A detachable handle for a device having a U-shaped intermediate section, said handle comprising an elongated handle member and a pair of flat faced, rectangular jaws, one of which is secured in outwardly extending relation to one end of said handle member, means movably attaching the other jaw thereto in spaced parallel relation to said secured jaw, a raised member on the flat face of said secured jaw opposite said other jaw for registry with said U-shaped section of said device, means urging said other jaw toward said raised member to hold said device thereon, and an offset section on the free end of the secured jaw.

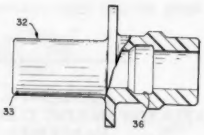


3,913,206

METHOD FOR REPLACEMENT OF WIRE SEAL, ELECTRICAL CONTACT

Norbert L. Moulin, Placentia, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 365,893, June 1, 1973. This application July 1, 1974, Ser. No. 484,913
Int. Cl.² B22D *19/10*; B23P *7/00*
U.S. Cl. 29—401 **3 Claims**



1. A method for placing a resilient seal on an electrical contact having a cable receiving end and a contact receiving end and having a cable secured to the contact within the cable receiving end, without requiring disengagement of the cable from the contact, comprising the steps of:

sliding the seal over a first end of a shaft and onto opening means at a second end of the shaft;

placing the contact receiving end within the opening means for locating the shaft second end adjacent the cable;

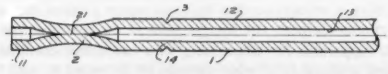
sliding the seal from the opening means and substantially onto the cable and cable receiving end of the contact; and removing the contact and cable, with the seal thereon, from the shaft.

3,913,207

METHOD OF MAKING SEALED TUBES

Roberto José Frey, 450, Guapore Str., Sao Paulo, Brazil

Filed Apr. 16, 1974, Ser. No. 461,387
Int. Cl.² B23P *17/00*
U.S. Cl. 29—413 **5 Claims**



1. A method of making hermetically sealed capillary tubes for installation in fluid systems, particularly refrigeration systems requiring pollution-free plumbing, comprising the steps of making a seamless capillary tube having an outer and an inner circumferential surface, an axis, and opposite end por-

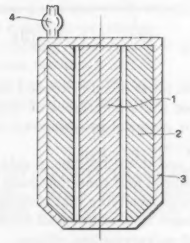
tions, said inner circumferential surface being free of pollutants; immediately sealing said end portions by shaping a longitudinal section thereof into a widened section so that opposite inner circumferential surface portions located on opposite sides of said axis are brought into direct contact with one another, thereby hermetically sealing the interior of said pollution-free tube; scoring said outer circumferential surface of said tube with two circumferential grooves, each of said grooves being inwardly adjacent a respective one of said end portions; and removing said sealed end portions by breaking the latter off at said grooves from the remainder of said tube immediately prior to installation of said tube in the fluid system.

3,913,208

PROCESS FOR PRODUCING BIMETALLIC AND POLYMETALLIC BODIES IN WHICH THE METALLIC COMPONENTS ARE JOINED TOGETHER WITH METALLURGICAL BOND

Gianfranco Colombi, Rome; Mario Gabaglio; Aldo Liscia, both of Turin; Mario Boccalari, Saluggia/Vercelli, all of Italy, and John M. Siergiej, Wayland, Mass., assignors to Comitato Nazionale per L'Energia Nucleare - CNEN, Rome, Italy

Filed Jan. 2, 1973, Ser. No. 320,196
Int. Cl. B21d *39/04*
U.S. Cl. 29—417 **2 Claims**



1. A process for producing a solid metal body made up of two adjoining sections having radial symmetry about the same axis, the peripheral portion of each of said sections consisting of a metal which is different from the other section but has a metallurgical affinity therewith, one of the two metals being harder than the other, which method comprises the following steps:

a. preparing two cylindrical blocks of substantially the same length each made of one of said metals different from the other and a cylindrical casing made of a malleable metal, one of said blocks being solid and the other being tubular with the inner diameter substantially equal to the outer diameter of the said one block, the inner diameter of said casing being substantially equal to the outer diameter of said other block;
b. degassing and cleaning said blocks and casing;
c. fitting said blocks one into the other to form a billet;
d. enclosing said billet in said casing, producing a vacuum therein and sealing it vacuumtight;
e. bringing said billet and casing to a plastic state by heating;
f. extruding said billet through a circular die to obtain a composite cylindrical solid bar of which the inner portion or core is made of one of said metals and the outer portion is made of the other of said metals the two metals being metallurgically bonded at the boundary between said portions, said composite cylindrical body being still enclosed in said casing;
g. cutting through said extruded bar along planes perpendicular to its longitudinal axis to obtain a number of segments;
h. removing from each segment so obtained the total of said basing and from a length of the segment all the outer portion and a shallow layer of the inner portion thereof whereby an integral body is obtained which comprises two contiguous cylindrical and coaxial sections of different diameter the one with smaller diameter consisting of that metal only of which the core of said bar was made and the one with larger diameter consisting of a core of one metal and an outer layer of another metal the same as with the said extruded bar, the interface along which the two metals are bonded being cylindrical and defined at one end by the end surface of the body and at the other end by the annular end surface of the larger diameter section.

3,913,209

METHOD OF IMPROVING FATIGUE LIFE OF MOLDED SULFUR-CURED RUBBER ARTICLES

John G. Sommer, Jr., Cuyahoga Falls, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 137,039, April 23, 1971, abandoned. This application June 29, 1973, Ser. No. 375,263
Int. Cl.[2] B23P *19/02;* **C08C** *17/28;* **C08D** *9/00, 13/28*
U.S. Cl. 29—451 **26 Claims**

1. The method of making an improved resilient bushing comprising the step of mounting an annular rubber insert in radially compressed relation between a cylindrical inner member and a cylindrical outer member, said improved bushing being characterized by the combination of low compression set, good reversion resistance and substantially improved fatigue life, the improvement wherein: said rubber inserts formed through the steps comprising in sequence:

A. preparing a rubber compound essentially comprising uncured rubber and containing between 0.5 phr and 1.5 phr sulfur;
B. molding said compound into the annular shape of said rubber insert;
C. heat curing said rubber insert completely in a single step as molded for a selected curing time interval at a selected curing temperature within a range of 280°F. to 380°F. (155°C to 211°C);
D. immersing said rubber insert after curing into a solution of sulfur dissolved into carbon disulfide, said solution being adapted to swell said rubber inset and to be absorbed into said rubber inset in an amount which is a function of the time interval in which said rubber insert is immersed;
E. allowing said solution to be absorbed into said rubber inset for a selected absorption time interval within a range up to about 60 minutes; and
F. driving off the volatile solvent constituents of said solution from said rubber insert while retaining the sulfur molecules of said solution within the rubber matrix of said rubber insert by vacuum drying.

3,913,210

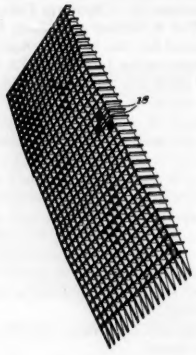
FABRICATED CELLULAR BODY AND METHOD FOR ASSEMBLING SAID BODY

Michael Charles Broad, London, England, assignor to Microcomb Structures Limited, Hadzor, near Droitwich, England

Continuation of Ser. No. 258,790, June 1, 1972, abandoned. This application Dec. 21, 1973, Ser. No. 427,226
Int. Cl.[2] B21D *39/00;* **B23K** *31/02*
U.S. Cl. 29—455 **16 Claims**

1. A method of manufacturing a fabricated cellular body of predetermined configuration provided be an array of flat sheet elements each occupying an intended position and intersecting other elements at pre-intended intersections to provide said body of predetermined configuration with opposite faces of larger superficial area in plan view than the area in side elevation of the perimeter of said body and with at least one of said opposite faces of non-planar form, said method comprising the steps of:

i. forming each of said flat sheet elements by chemical blanking
   a. with at least one slot therein through a portion of the width of the element for enabling said pre-intended intersections of the elements of the array to be effected, and
   b. with a predetermined outline shape and size according to the intended position thereof in the array and such that subsequent shaping of each element and of the assembled area to form said predetermined configuration of the body is unnecessary;
ii. assembling the formed flat sheet elements in their intended array positions with said slots in mutual interengagement at said intended intersections; and
iii. securing the intersecting flat sheet elements of the assembled array in said positions relative to one another.



3. A cellular structure comprising first and second sets of flat pieces of material, each of the said pieces of the said first and second sets occupying a pre-determined position and having a chemically blanked form defining a pre-shaped outline therefor appropriate to its said predetermined position and at least one slot partially through its width at a predetermined location, the pieces of the said first set and of the said second set being arranged in said predetermined positions so that the slots thereof interlock to form the cellular structure with a predetermined configuration having opposite faces of larger superficial area in plan view than the area in side elevation of the perimeter of the body and with at least one of said opposite faces of non-planar form, and means joining said pieces of said first and second sets together.

3,913,211

METHOD OF MOS TRANSISTOR MANUFACTURE

Robert B. Seeds, Palo Alto, and Robert L. Luce, Los Altos Hills, both of Calif., assignors to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Division of Ser. No. 323,672, Jan. 15, 1973, abandoned. This application Feb. 11, 1974, Ser. No. 441,098

Int. Cl. B01J *17/00*

U.S. Cl. 29—571 **8 Claims**

1. The method of producing an MOS transistor which comprises the steps of:

forming a first layer of oxide of semiconductor material over a substrate of said semiconductor material;

forming a layer of silicon nitride over said oxide;

forming a relatively thick second layer of silicon dioxide over said layer of silicon nitride;

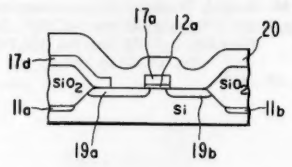
removing those portions of said second layer of silicon dioxide and said layer of silicon nitride over those regions of said semiconductor material in or on which source, drain and gate regions will not be formed;

growing additional oxide of said semiconductor material on those portions of said wafer from which said second layer of silicon dioxide and said layer of silicon nitride have been removed, said additional oxide of said semiconductor material being grown through said first layer, the oxide connecting said additional oxide to the portions of said first layer of oxide of semiconductor material beneath the remaining portions of said silicon nitride and said second layer of silicon dioxide substantially gradually tapering from the thickness of said additional oxide to the thickness of said first layer;

removing the remaining portions of said silicon nitride and said second layer of silicon dioxide to leave exposed the top surfaces of said first layer and said additional oxide;

forming a layer of polycrystalline silicon over the top surfaces of said first layer and said additional oxide;

forming windows through selected portions of said polycrystalline silicon to expose the top surfaces of those portions of said first layer overlying those regions of said semiconductor material in which will be formed source and drain regions;



removing at least parts of said exposed regions of said first layer to expose the top surfaces of those regions of said semiconductor material in which will be formed source and drain regions;

forming source and drain regions in said underlying semiconductor material and simultaneously doping that polycrystalline silicon overlying that portion of said first layer of oxide between said source and drain regions and any other exposed polycrystalline silicon;

forming a passivation layer over the top surfaces of said polycrystalline silicon and any other exposed materials;

forming windows in said passivation layer to expose diffused regions in said underlying semiconductor material to which electrical contact must be made; and

forming conductive leads over the top surface of said passivation layer, said conductive leads contacting through openings in said passivation layer the underlying diffused regions in said semiconductor material and selectively contacting said polycrystalline silicon.

3,913,212

NEAR-INFRARED LIGHT EMITTING DIODES AND DETECTORS EMPLOYING $CdSnP_2$:InP HETERODIODES

Klaus Jurgen Bachmann, Piscataway; Ernest Buehler, Chatham; Joseph Leo Shay, Marlboro, and Jack Harry Wernick, Madison, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 315,359, Dec. 15, 1972, abandoned. This application July 23, 1973, Ser. No. 382,021

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[3] B01J *17/00*

U.S. Cl. 29—576 **11 Claims**

1. A process for growing a heterojunction device, comprising the steps of

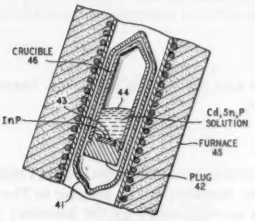
introducing cadmium, tin and phosphorus initially into the lower end of an elongated, generally vertically-oriented crucible, and the phosphorus and cadmium being present in respective atomic proportions greater than approximately 2:1 and the tin being present in an atomic proportion to the cadmium substantially greater than 10:1,

mounting a single crystal of InP in the upper end of said crucible and closing said crucible,

heating said crucible to a temperature in the range from 526° Centigrade to 610° Centigrade while maintaining said ends at substantially equal temperatures to produce a homogeneous solution of Cd, Sn and P,

lowering the temperature to a temperature in the range from 450° Centigrade to 510° Centigrade,

tipping the crucible to bring the solution into contact with the crystal,



inducing epitaxial growth by cooling the furnace at a rate in the range from about 1.0° Centigrade per hour to about 20° Centigrade per hour while maintaining said ends at substantially equal temperatures,

removing the resulting substantially single-crystal structure from the excess reactants, and

attaching respective electrodes to the original crystal and the grown region of said structure.

3,913,213

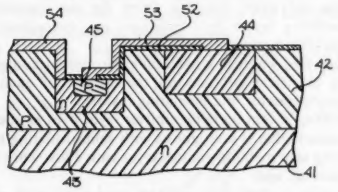
INTEGRATED CIRCUIT TRANSISTOR SWITCH

Thomas Gene Mills, Carson, and Beethoven Corpus Valino, Los Angeles, both of Calif., assignors to TRW Inc., Los Angeles, Calif.

Filed Aug. 2, 1974, Ser. No. 494,089

Int. Cl.² B01J *17/00*

U.S. Cl. 29—577 **9 Claims**



1. The method of making a high speed semiconductor switch which comprises the steps of:

a. forming first and second layers of semiconductor material of first and second conductivity type material;

b. diffusing dopant of first conductivity type into two spaced regions of said second layer whereby the first of said regions, said second layer, and said first layer form an emitter, base, and collector respectively of a first transistor;

c. removing a portion of the depth of said second region;

d. forming a semiconductor diode junction at the exposed surface of said second region;

e. conductively coupling said second region in the area away from said junction to said second layer; and

f. conductively coupling the other portion of said diode to said first region.

3,913,214

METHOD OF PRODUCING A SEMICONDUCTOR DEVICE

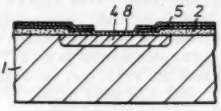
Reinhold Kaiser, Heilbronn, Germany, assignor to Licentia Patent-Verwaltungs, Frankfurt, Germany

Division of Ser. No. 74,274, Sept. 22, 1970, Pat. No. 3,817,750. This application Jan. 22, 1974, Ser. No. 435,514

Claims priority, application Germany, May 5, 1970, 2021922

Int. Cl.² B01J *17/00*

U.S. Cl. 29—578 **10 Claims**



1. In a method of producing a semiconductor device comprising the steps of covering one surface of a semiconductor body with an insulating layer, removing part of said insulating layer so as to define an aperture therein, diffusing into said semiconductor body through this aperture a region of opposite type of conductivity to that of said semiconductor body, and closing up said insulating layer over said aperture; the improvement comprising: thereafter applying a metal layer to the entire surface of said insulating layer; applying a photosensitive layer to said metal layer; removing part of said photosensitive layer, said metal layer and said insulating layer by a photolithographic etching technique to form a contact making window for making contact to said diffused region; removing said photosensitive layer while leaving said metal layer on said insulating layer; and covering at least the surface of said semiconductor body exposed by said contact making window with a layer of electrode material.

3,913,215

PROCESS FOR THE PRODUCTION OF A SEMICONDUCTOR COMPONENT

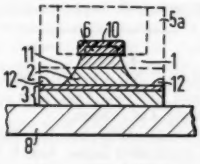
Herwig Heckl, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 6, 1974, Ser. No. 467,300

Claims priority, application Germany, May 9, 1973, 2323438

Int. Cl.² B01J *17/00*

U.S. Cl. 29—578 **18 Claims**



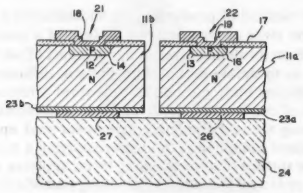
1. Process for the production of a semiconductor component in which a disc-shaped semiconductor crystal is covered on one side with a uniform epitaxial semiconductor layer, and then material is removed from the semiconductor surface in such a manner that a recess is formed, and in which both the epitaxial layer and the material of the original semiconductor crystal is provided with at least one electrode, characterized in that following the production of the epitaxial semiconductor layer, the side of the epitaxial layer facing away from the original semiconductor crystal is first covered with a first metal electrode in the form of a layer, then the original semiconductor crystal is, on the side facing away from the epitaxial layer, provided with at least one recess and inside the recess is provided with an etching mask which preferably forms the second electrode, and with the aid of this etching mask, semi-

conductor material is etched away from all around this etching mask, in such a manner that the semiconductor surface which has been newly formed as a result of the etching process intersects the junction between the epitaxial layer and the material of the original semiconductor crystal at least once along a closed curve, and that the second metal electrode is applied at the location of the etching mask.

3,913,216
METHOD FOR FABRICATING A PRECISION ALIGNED SEMICONDUCTOR ARRAY

Aaron Ballonoff, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale and Watkins-Johnson Company, Palo Alto, both of, Calif., part interest to each

Filed June 20, 1973, Ser. No. 371,743
Int. Cl.² B01J *17/00*
U.S. Cl. 29—580 **9 Claims**



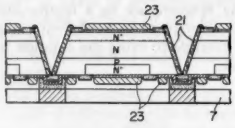
1. A method for forming a precision aligned array of spaced semiconductor devices from a single substrate comprising the steps of forming a plurality of the semiconductor devices in the front side of a single semiconductor substrate, forming metallization on the backside of the semiconductor substrate, separately forming a plurality of metallized bonding pads on an insulating substrate, said semiconductor substrate being isolated from this separate formation step, bonding the metallized back surface of the semiconductor substrate to the bonding pads carried by the insulating substrate, and removing a strip of the semiconductor substrate extending from its front side between each of the adjacent plurality of semiconductor devices through to its backside and removing selected portions of said backside metallization simultaneous with the removal of said strip of substrate so that a plurality of semiconductor devices are formed with each individual device being carried by the insulating substrate and with adjacent devices being physically spaced from one another and completely electrically isolated from one another while preserving their original alignment with respect to one another.

3,913,217
METHOD OF PRODUCING A SEMICONDUCTOR DEVICE

Yutaka Misawa, and Hideyuki Yagi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 26, 1973, Ser. No. 382,691
Claims priority, application Japan, Aug. 9, 1972, 47-79117
Int. Cl.² B01J *17/00*; H01L *7/00*
U.S. Cl. 29—580 **10 Claims**

1. A method of producing a semiconductor device, comprising a first step of forming desired PN junctions in a large-area semiconductor wafer, a second step of attaching a backing member to one of the principal surfaces of said semiconductor wafer by use of an adhesive binding layer, said backing member having apertures therethrough exposing said one principal surface of the wafer and lateral portions of said binding layer, a third step of incising selectively said semiconductor wafer from the other principal surface to said one principal surface to form a plurality of small-area semiconductor pellets each having at least one PN junction exposed in the surface formed due to the incision, a fourth step of forming a glass film on that surface of each semiconductor pellet formed due to the incision, a fifth step of detaching said semiconductor pellets from said backing member by etching said binding layer through said exposed lateral portions, and a sixth step of forming

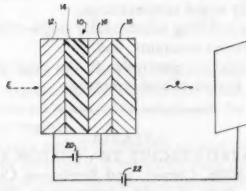


electrodes on said semiconductor pellets between said first and fifth steps.

3,913,218
TUNNEL EMITTER PHOTOCATHODE

Brian S. Miller, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 4, 1974, Ser. No. 476,248
Int. Cl.² B01J *17/00*
U.S. Cl. 29—585 **8 Claims**



1. A method of producing a tunnel emitter photocathode, the steps comprising:
providing a thin layer of semiconductor material;
depositing a thin insulating layer on one side of said semiconductor material at a fast rate;
baking the wafer resulting from the semiconductor and insulating layers in a hydrogen gas atmosphere for an extensive period;
placing said wafer in a vacuum environment and evaporating electrical contacts on the outside of each of said semiconductor and insulating layers;
depositing a thin metallic emitter layer over said electrical contacts that is contiguous with said insulating layer;
treating said metallic emitter layer with a low work function material; and
providing a first bias voltage source to said electrical contacts to produce an electric field across said insulating layer between said semiconductor and said metallic emitter layer for tunneling electrons generated in said semiconductor through said insulating layer into said metallic emitter layer and out said low work function material.

3,913,219
PLANAR CIRCUIT FABRICATION PROCESS

George Jay Lichtblau, 425 E. 63rd St., New York, N.Y. 10021

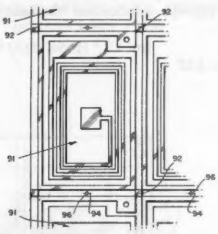
Filed May 24, 1974, Ser. No. 473,187
Int. Cl.² H05K *3/06*; H01G *7/00*
U.S. Cl. 29—592 **30 Claims**

1. A method for fabricating a plurality of individual planar resonant tags each having at least one self-contained operative tuned circuit with integrally formed circuit elements including at least one inductor and at least one capacitor, said method comprising the steps of:

providing an insulative substrate web of material of predetermined thickness and dielectric characteristics and with a conductive surface on each opposite side thereof;

printing with an etchant-resistive material a first repetitive circuit pattern including the formation of at least one inductor and a conductive area serving as a portion of said at least one capacitor on one conductive surface of said substrate web;

printing with an etchant-resistive material a second repetitive circuit pattern on the other conductive surface of said substrate web in predetermined relation to said first repetitive circuit pattern and including the formation of a conductive area in alignment with the conductive area



on said one conductive surface and serving as a portion of said at least one capacitor;

said first and second printed circuit patterns providing said planar tags with said conductive areas and the interposed dielectric material provided by said substrate web defining said at least one capacitor;

etching said first and second circuit patterns to remove unprinted portions of said conductive surfaces on both sides of said substrate web thereby to provide repetitive first and second cooperative conductive circuit patterns conforming to said printed circuit patterns; and

separating cooperative circuit patterns to provide individual planar resonant tags.

3,913,220

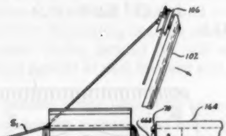
ARMATURE WINDING METHOD

Jerry E. Miller, Dayton, Ohio, assignor to The Globe Tool and Engineering Company, Dayton, Ohio

Division of Ser. No. 704,342, Feb. 9, 1968, Pat. No. 3,506,864. This application Oct. 15, 1969, Ser. No. 871,190

Int. Cl.² H02K *15/09*

U.S. Cl. 29—597 **19 Claims**



1. In a method of winding armatures wherein a plurality of coils are wound from a continuous strand of wire in plural pairs of spaced coil receiving slots of an armature core mounted on an armature shaft and wire leads between subsequently wound coils are connected to a commutator on said shaft, the improvement wherein each of said coils is wound by a flier device rotating in the same direction when winding all of said coils and the wire leads connected to the commutator between coils are looped in a predetermined direction completely about the armature shaft without being returned from the commutator in a direction opposite to said predetermined direction and wherein the wire leads extend directly into coil receiving slots of each subsequent wound coil without being returned from the commutator in a direction opposite to said predetermined direction.

3,913,221

METHOD FOR PRODUCING A MULTICHANNEL MAGNETIC HEAD

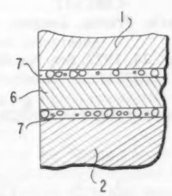
Hiroshi Muraoka; Michinori Narui, both of Tokyo, and Keiji Sugiyama, Tsuru, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 7, 1974, Ser. No. 495,467

Claims priority, application Japan, Aug. 7, 1973, 48-88643

Int. Cl.² G11B *5/42*

U.S. Cl. 29—603 **3 Claims**



1. A method for producing a multichannel magnetic head comprising the steps of:

fixing a plurality of similarly cut core elements to a core holder in side to side, spaced positions with each element having a machined gap forming surface facing away from said core holder the relative lateral gap position between the core elements to constitute a first element assembly, forming an identical second core element assembly to that of the first assembly,

positioning said first and second core element assemblies in predetermined fixed relative positions with the machined gap forming surfaces facing each other but spaced therefrom at each core element position,

filling the spaces between the core elements with a binder comprising an adhesive and globular particles, and

inserting a shield plate within the spaces between the side to side spaced core elements, the improvement wherein; the largest diameter of the particles of said binder being equal to the distance between the shield plate and each respective core element, and wherein insertion of the shield plate between said core elements is aided by rotation of the particles during penetration of said binder by said shield plate such that said shield plate is automatically centered in each case between respective core elements.

3,913,222

METHOD OF MANUFACTURING A TRIMMER POTENTIOMETER

Russell J. Bernard, La Habra, Calif., assignor to Spectrol Electronics Corporation, City of Industry, Calif.

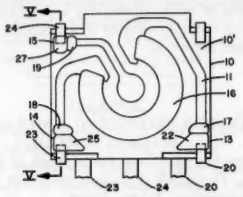
Filed May 13, 1974, Ser. No. 469,195

Int. Cl.² H01C *17/28*

U.S. Cl. 29—621 **6 Claims**

1. In the method of manufacturing a trimmer potentiometer, including a nonconductive substrate, wherein a conductive track is deposited on a first surface of the substrate, resistance material is deposited on the surface of the substrate to form a resistance path, and terminal pins are soldered to the ends of the conductive track, the improvement comprising:

depositing an additional quantity of resistance material on selected portions of the conductive track to form dam



sections functioning to limit the flow of solder along the conductive track to predetermined sections thereof.

3,913,223
METHOD OF MANUFACTURING A DOUBLE-SIDED CIRCUIT

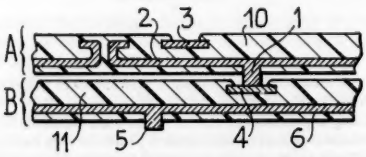
Claude Gigoux, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Oct. 24, 1973, Ser. No. 409,295

Claims priority, application France, Oct. 27, 1972, 72.38200

Int. Cl.² H05K *3/06, 3/28*

U.S. Cl. 29—625 **5 Claims**



1. A method of manufacturing a double-sided circuit comprising at least one stud and at least one contact surface such that after stacking of said circuit with one another circuit of the same type, a stud of said circuit is in contact with a surface of said another circuit, said method comprising the following steps:

1. upon a temporary substrate etchable by predetermined chemical agent, having two opposite faces, forming through a first appropriate mask of photosensitive resin deposited upon said two faces, first, second and third zones where said resin is eliminated to bare said substrate, said first and second zones being opposite upon each of said two faces;
2. etching said substrate through said first and second zones to form a hole through said substrate;
3. depositing by electrolysis a first layer of a metal resistant to said agent upon said third zone corresponding to said stud;
4. baring said substrate through a second appropriate mask according to a predetermined pattern;
5. depositing by electrolysis said resisting metal everywhere said substrate is bared in order to form at least a first and a second conductor, said first conductor laying upon said first layer and upon the wall of said hole;
6. depositing a first film of resin of positive type on the face of the device thus obtained, corresponding to said stud and a second film of said resin upon the opposed face, and depositing upon said second film a protective film of dry photosensitive resin of negative type covered with polyethylene terephthalate;
7. etching a first part of said temporary substrate through a window made in said first film to hollow out a recess beneath said second conductor over half the width of said second conductor, and replacing said first part and said first film with said dielectric material;
8. etching the other part of said temporary substrate
9. recovering said both faces thus obtained with said dielectric material;
10. engraving said material through a third appropriate mask to bare said stud and said contact surface.

3,913,224
PRODUCTION OF ELECTRICAL COMPONENTS, PARTICULARLY RC NETWORKS

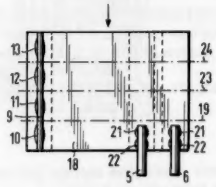
Karl-Heinz Preissinger, Taufkirchen; Ulrich Wehnelt, Starnberg; Hermann Heywang; Manfred Kobale, both of Munich, and Dietrich Ristow, Neubiberg, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Sept. 19, 1973, Ser. No. 398,863

Claims priority, application Germany, Sept. 27, 1972, 2247279

Int. Cl.² H05K *3/32*

U.S. Cl. 29—625 **34 Claims**



1. A method of producing an electrical component comprising the steps of: applying first and second conductive layers respectively to opposite sides of a thermoplastic carrier foil; forming contacting areas at selected locations on said conductive layers; covering each of the conductive layers with a polyethylene terephthalate covering layer; positioning wires adjacent the covered contacting areas; and fusing the wires with the contacting areas by heating the wires and impressing the heated wires through the covering layers and through and into electrical contact with the contacting areas.

3,913,225
DRY SHAVING APPARATUS WITH SHEAR PLATE BIASING MEANS

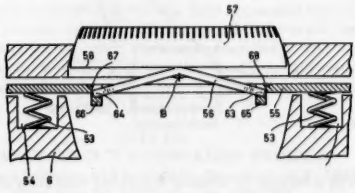
Eduard Willem Tietjens, and Dirk Jan Van Hemmen, both of Drachten, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 11, 1974, Ser. No. 449,846

Claims priority, application Netherlands, Mar. 31, 1973, 7304527

Int. Cl.² B26B *19/14*

U.S. Cl. 30—43.6 **13 Claims**



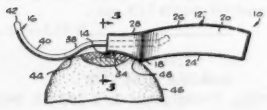
1. In a dry shaver including a housing, at least one cutter guard and a cooperating cutter that is rotatable about its axis, a holder in which said guard is movably mounted, the first spring means for resiliently urging said cutter axially upward (when said shaver is upright) into engagement with said guard which is thereby urged upward in engagement with said

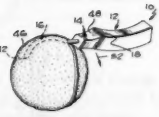
mount, the improvement in combination therewith wherein said holder includes a circular aperture defined by a rim having first diameter, said guard has an outer surface which is spherically curved, has diameter corresponding to said first diameter, and is situated within and engaging said rim, said spherical surface having its center situated substantially on said cutter axis, said guard and cutter together being both pivotable in said rim and depressible axially downward against said first spring means.

3,913,226
CITRUS CUTTER

Antonio R. Lovato, and Victoria C. Lovato, both of 10214 San Luis Ave., South Gate, Calif. 90280

Filed July 8, 1974, Ser. No. 486,502
Int. Cl.² B26B *11/00*
U.S. Cl. 30—123.5 **1 Claim**





1. A citrus cutter comprising:

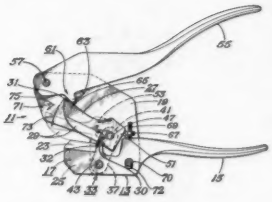
a handle for manual engagement, said handle having substantial bulk and being substantially square in cross section and having a forward end, an arcuate bottom surface portion on said handle having a radius of curvature of a citrus fruit, said arcuate bottom surface terminating at said forward end of said handle, a citrus fruit skin cutter integrally formed with said handle and extending downwardly therefrom for cutting into the skin of a citrus fruit, said skin cutter being located on said arcuate bottom surface of said handle at said forward end of said handle; and

a citrus fruit peeling probe consisting of a rod of circular cross section having a shank end extending rearwardly into said handle through said handle forward end for rigid mounting of said probe and extension of said probe therefrom, said probe being directed straight out from said handle and then with a downward bend and then arcuately upwardly to provide a concave bend in a direction opposite to that of said handle bottom surface for use in insertion under and peeling away of the fruit skin, said downward bend of said probe providing a forward contact point lying on the same arc as but forwardly displaced from said arcuate bottom surface of said handle, said skin cutter residing substantially midway along such arc defined by said arcuate bottom handle surface and said forward contact point whereby such skin cutting action is both limited and secure.

3,913,227
MILD-STEEL CUTTER

William Francis Shurtleff, White Settlement, Tex.

Continuation-in-part of Ser. No. 411,180, Feb. 26, 1974, abandoned. This application Oct. 17, 1974, Ser. No. 515,519
Int. Cl.² B26B *17/02*
U.S. Cl. 30—181 **1 Claim**



1. A cutting tool comprising:

a. a base structure;

b. a base handle fixedly carried by said base structure;

c. a first cutting jaw rigidly connected with said base handle and having a first cutting edge and a supporting high strength portion;

d. a second cutting jaw having a second cutting edge and a high strength thick portion adapted for transmitting large forces to said cutting edge; said second cutting jaw being pivotally mounted adjacent said first cutting jaw with said second cutting edge movable contiguous said first cutting edge while cutting an object;

e. a compound linkage arrangement connecting said second cutting jaw with said base structure so as to be reversibly movable toward, along, and into engagement with said first cutting jaw in a motion that has a slicing component, as well as a shearing component, and thereby enable cutting with only one hand an elongate metallic object and the like that heretofore required both hands of a worker;

f. a second handle pivotally carried by said base structure for movement with respect to said base handle;

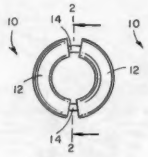
g. leverage multiplying means for applying to said second cutting jaw a force of large magnitude and having slicing and shearing components, said applying being responsive to movement of said base and second handles toward each other, said leverage multiplying means being connected to said second handle means and engaging said thick portion of said second cutting jaw for forcing said second cutting jaw towards said first cutting jaw with said large force having said shearing and slicing component;

said compound linkage arrangement comprising a pair of links having base ends and movable ends and mounted on each side of said base structure and pivotally movable about a shaft at their base ends; and a jaw shaft penetrating through a noncutting end of said second cutting jaw and through said movable ends of said pair of links such that said second cutting jaw can be forced to pivot about said jaw shaft, simultaneously pivot about said base shaft for slicing movement and move toward said first cutting jaw for severing of said object; said leverage multiplying means being disposed adjacent the end of said second cutting jaw opposite said non-cutting end thereof; said base structure including a pair of sides, one on each side of said handles and cutting jaws; said pair of links being disposed exteriorly of said sides and an arcuate slot being cut through said sides to allow arcuate and pivotal movement of said jaw shaft about said base shaft for effecting said slicing and shearing movement of said second cutting jaw with respect to said first cutting jaw; such that a worker can cut through elongate metallic objects with one hand while employing the other to save the cut portion of said object, thereby conserving time of said worker.

3,913,228
ELASTIC ORTHODONTIC APPLIANCES

Melvin Wallshein, 8645 Bay Parkway, Brooklyn, N.Y. 11214

Continuation of Ser. No. 310,574, Nov. 29, 1972. This application Apr. 22, 1974, Ser. No. 462,657
Int. Cl. A61c 7/00
U.S. Cl. 32—14 A 25 Claims



1. A tooth separator comprising an elastic ring, said ring having main portions of predetermined cross sectional area, and having at least one strand portion of cross sectional area along its length which is reduced relative to said predetermined cross sectional area to form a connecting strand extending between said main portions of said ring, whereby tensioning said strand further reduces the cross sectional dimensions thereof to permit the same to be forced through a contact area between two adjacent teeth, said main portions being wedged between non-contacting portions of two adjacent teeth when tensioning of said strand is released and said strand seeks to become restored to the initial length thereof, said main portions of said ring applying opposing forces to the two adjacent teeth which cause the same to separate.

3,913,229
DENTAL TREATMENTS

Thomas D. Driskell; Alfred L. Heller, both of Worthington, and Joseph F. Koenigs, Columbus, all of Ohio, assignors to Miter, Inc., Worthington, Ohio

Filed Feb. 25, 1974, Ser. No. 445,678
Int. Cl.² A61K 5/01
U.S. Cl. 32—15 29 Claims

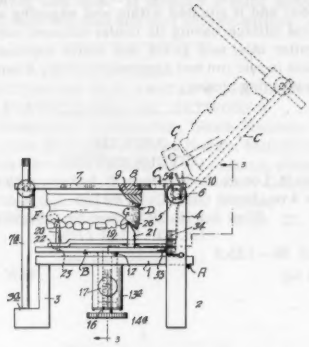
1. A method for enabling the naturally functioning growth of at least one of the following: fibroblasts, odontoblasts, cementoblasts and osteoblasts, said method comprising positioning a porous mass of a physiologically soluble and compatible calcium phosphate compound adjacent the calcified tissues of a tooth and in contact with a blood supply sufficient to permit the formation of a blood clot in said calcium phosphate compound.

3,913,230
DENTAL SETUP GUIDE AND DIAGNOSTIC INSTRUMENT

Harry Weiss, 612 S. Center St., Orange, N.J. 07050

Filed May 24, 1974, Ser. No. 472,986
Int. Cl.² A61C 11/00
U.S. Cl. 32—32 10 Claims

1. A dental setup guide and diagnostic instrument comprising a frame having legs, a setup platform mounted on said frame for vertical movement and having a horizontal flat upper surface, means to vertically adjust said platform including a shaft projecting centrally from the bottom of said platform and vertically slidably mounted in a guide fixed on said frame and means manually movable on said frame and coactive with said shaft to move said platform up and down, horizontally spaced and alined bearing seats on said frame above and posteriorly of said setup platform to removably receive and pivotally support the pivot trunnions of the upper member of an articulator, providing for selective mounting and removal of an articulator member into and from said seats, respectively, for swinging of said articulator member downwardly toward and upwardly away from said platform, and for



vertical movement of said platform toward and away from said articulator member.

3,913,231
SALIVA EJECTOR

John Harry Orsing, Avangsgatan 2, S-253 71 Helsingborg, Sweden

Filed Oct. 23, 1974, Ser. No. 517,344
Claims priority, application Sweden, Oct. 24, 1973, 7314407
Int. Cl.² A22C 11/00
U.S. Cl. 32—33 6 Claims

1. A single-use saliva ejector comprising a flexible tube, a stiffening flexible wire disposed in said tube, and a bend formed by said wire, said bend having a largest cross dimension which is larger than the inner diameter of the tube and being drawn for at least a major portion thereof into the tube from one end thereof in order to keep an end portion of the tube streched and flattened the wire being at the same time retained in the tube by said bend.

3,913,232
MEASURING DEVICE

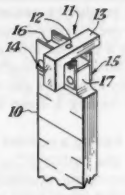
William B. Marcell, 3950 NW. 36 Terrace, Fort Lauderdale, Fla. 33309

Filed May 1, 1974, Ser. No. 465,916
Int. Cl.² B43L 7/00; G01B 3/04
U.S. Cl. 33—107 R 2 Claims

1. A measuring device having a distal end and a proximal end and being calibrated for linear measurement between said ends,

spring mounted means on the distal end of the device, rotatable about the linear axis of the device, and movable upwardly into an operating position, and

a tab, depending downwardly from said spring mounted means and parallel to the axis of said device but spaced



from a surface thereof when rotated through an arc of 90°.

3,913,233

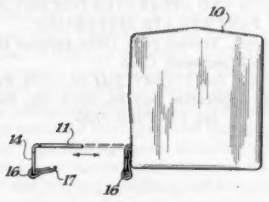
MEASURING DEVICE

William B. Marcell, 3950 NE. 36 Terrace, Ft. Lauderdale, Fla. 33309

Filed May 1, 1974, Ser. No. 465,867

Int. Cl.² G01B *3/10*

U.S. Cl. 33—137 R **1 Claim**



1. A measuring device comprising a casing, a flexible tape having a distal end and a proximal end and being calibrated for linear measurement between said ends,

a tab on the distal end of said measuring device, fixedly disposed at an angle of 90° to the plane of said measuring device,

said tab having an opening through which a tongue looped and thereby held to said tab,

said tongue being rotatable in said opening from a rest position in which it is in contact with the surface of said tab to an operating position at no more than 85°, said tongue having a curved portion, and in which the curved portion of the tongue is such that as the measuring device is being withdrawn into the casing, the tongue makes contact with the base of the casing to pivot itself into contact with the tab — has been inserted.

3,913,234

APPARATUS FOR MEASURING WALL THICKNESS

Tom J. Windle, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 11, 1974, Ser. No. 460,043

Int. Cl.² G01B *5/06*

U.S. Cl. 33—147 E **8 Claims**

1. Apparatus for measuring the wall thickness of a pipe sample comprising

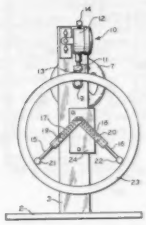
a. a support;

b. a sample support means having a first and a second end portion and being rotatably arranged in a bearing, said bearing being fixed to said support with its axis horizontally arranged, said first end portion being cylindrically shaped for carrying said pipe sample, the axis of said first end portion being coextensive with the axis of the bearing;

c. means for rotating said sample support means in said bearing; and

d. measuring means attached to said support comprising

aa. a sensing means to contact the upper external side of the pipe sample; and



bb. indicating means operatively connected to said sensing means to indicate the distance between said first cylindrical end portion and said sensing means.

3,913,235

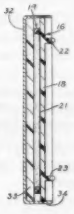
APPARATUS FOR MARKING PANEL

Milton T. Tenneson, Frost, and Arno A. Mathews, Blue Earth, both of Minn.

Division of Ser. No. 321,325, Jan. 8, 1973. This application June 10, 1974, Ser. No. 478,027

Int. Cl.² B25H *7/04*; G01B *3/14*

U.S. Cl. 33—174 G **8 Claims**



4. The apparatus of claim 1 wherein: the base is a generally flat plate, said plate has a rib means projected outwardly from one side of the plate, said second means having a member having a groove receiving said rib means to attach the second means to the plate.

3,913,236

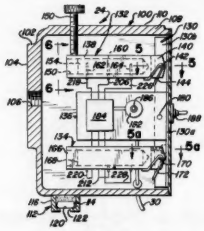
APPARATUS FOR DETERMINING WHEEL ALIGNMENT

Louis L. Butler, Baton Rouge, La., assignor to Bear Manufacturing Corporation, Rock Island, Ill.

Continuation of Ser. No. 234,838, March 15, 1972, abandoned. This application Sept. 13, 1973, Ser. No. 396,812

Int. Cl.[2] G01B 5/255

U.S. Cl. 33—336 **7 Claims**



4. An apparatus as claimed in claim **3**, wherein said last-mentioned means comprises rectifier circuit means connected between each of second and third junctions and said fourth junction, and a d.c. volt meter connected between said rectifier circuits.

3,913,237

METHOD OF AND A PLANT OF PRODUCING CEMENT CLINKER FROM CEMENT SLURRY

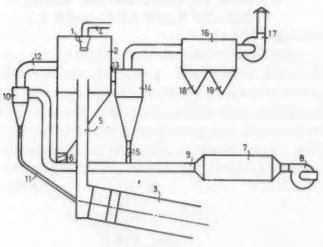
Martin Gronlund, Holte, and Klaus Erik Gude, Vedbaek, both of Denmark, assignors to Aktieselskabet Niro Atomizer, Soborg, Denmark and F. L. Smidth & Co., Cresskill, N.J.

Filed Dec. 26, 1973, Ser. No. 427,614

Claims priority, application Denmark, Jan. 5, 1973, 46/73

Int. Cl.[2] F26B 3/08; F27B 15/00

U.S. Cl. 34—10 **10 Claims**



1. A method of producing cement clinker from cement slurry said method comprising the steps of:

a. introducing cement slurry into an atomizing device in a spray drier, said atomizing device having means for generating a whirling spray;

b. spraying the cement slurry from the atomizing device into the drying chamber of the spray drier in order to produce spray-dried powder cement raw meal;

c. preheating the spray-dried powder cement raw meal at least in part with a separately heated gas; and

d. after the separately heated gas has been used in preheating the spray-dried powdered cement raw meal, introducing the separately heated gas into the spray drier to help in the spray drying step.

3. A plant for producing cement clinker from cement slurry, said plant comprising:

a. a spray drier having an atomizing device which generates a whirling spray and which serves as an inlet for the cement slurry, a drying chamber for drying the cement slurry, a powder outlet, at least one gas inlet, and a gas outlet;

b. a rotary kiln for producing cement clinker from spray-dried cement raw meal derived from said spray drier, said rotary kiln having a powder inlet and a gas outlet;

c. first means providing communication between the gas outlet of said rotary kiln and a gas inlet of said spray drier;

d. a heating unit having a fresh air inlet and a hot air outlet;

e. a heat exchanger having a powder inlet, a powder outlet, a gas inlet, and a gas outlet;

f. second means providing communication between the powder outlet of said spray drier and the powder inlet of said heat exchanger;

g. third means providing communication between the powder outlet of said heat exchanger and the powder inlet of said rotary kiln;

h. fourth means providing communication between the hot air outlet of said heating unit and the gas inlet of said heat exchanger; and

i. fifth means providing communication between the gas outlet of said heat exchanger and a gas inlet of said spray drier.

3,913,238

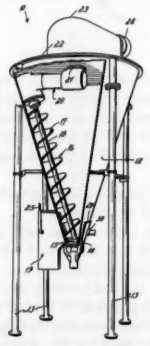
METHOD AND APPARATUS FOR DRYING PARTICULATE MATERIALS

Louis B. Updegrove, Terrace Park, Ohio, assignor to The J. H. Day Company, Cincinnati, Ohio

Division of Ser. No. 273,647, July 20, 1972, Pat. No. 3,775,863. This application July 26, 1973, Ser. No. 382,868

Int. Cl.[2] F26B 7/00

U.S. Cl. 34—12 **5 Claims**



1. A method of drying particulate material to an ultra high degree of dryness wherein said material has a moisture content of from 0.01 to 0.05%, said method comprising the steps of:

placing a batch of said material in a mixing vessel,

mechanically agitating the material by means of an agitator of small size in relation to said vessel,

simultaneously sweeping the material with a stream of air under low pressure, the air being pre-dried to a dew point of from approximately −10°F. to approximately −40°F. and being heated to a temperature less than 400°F. but above the temperature at which the material would degrade,

said agitator causing said material to flow in both a countercurrent and cocurrent relationship to said air stream and to flow in direction transverse to the direction of said air stream whereby said material is thoroughly mixed and dried, and maintaining, by means of said agitation, the

entire quantity of material at a substantially uniform temperature.

3,913,239

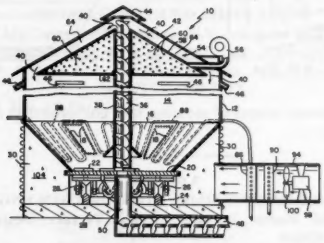
GRAIN DRYING STORAGE BIN

Kermit H. Burgin, R.R. No. 1, Whitestown, Ind. 46075

Filed Nov. 29, 1974, Ser. No. 528,080

Int. Cl.² F26B *25/00*

U.S. Cl. 34—102 **6 Claims**



1. Grain drying and storing apparatus comprising an upstanding storage bin for receiving grain, said bin having a lower portion and an upper portion, means for heating the grain in said lower portion to cause it to sweat, cooling and drying means in said upper portion, and means for conveying the grain upwardly from said lower portion to said cooling and drying means, said cooling and drying means including means defining a passageway through which the heated grain moves, and blower means for moving cool air through the grain in said passageway, said heating means including a source of fluid, conduit means connecting said source of fluid to the lower portion of said bin, said conduit means being in heat-conducting relationship with the grain in said lower portion, and means for heating the fluid source.

3,913,240

SIEVE ROLL FOR USE IN PAPER DRYING APPARATUS OR THE LIKE

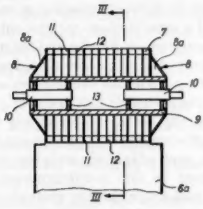
Hans Flämig, Heidenheim, Brenz, Germany, assignor to J. M. Voith GmbH, Heidenheim, Germany

Filed Nov. 22, 1974, Ser. No. 526,369

Claims priority, application Germany, Nov. 24, 1973, 2358577

Int. Cl.² F26B *11/02*

U.S. Cl. 34—114 **10 Claims**



1. A rotary sieve roll, particularly for use in apparatus for drying paper webs, comprising a shaft assembly; a pair of axially spaced end walls coaxial and rigid with said shaft assembly; a plurality of axially spaced rings surrounding said shaft assembly intermediate said end walls, said rings having outer edge portions; and a hollow cylindrical side wall including a plurality of circumferentially spaced elongated strips having end portions rigid with said end walls and extending in parallelism with the axis of said shaft assembly and intermediate portions connected with said outer edge portions of said rings, said strips defining openings with said rings and each strip being located in a plane including the axis of said shaft assembly, each of said end walls having a substantially triangular cross-sectional outline as considered in a plane including the axis of said shaft assembly, each of said outlines having an outer corner portion adjacent to the respective end portions of said strips and two additional corner portions adjacent to said shaft assembly.

3,913,241

APPARATUS FOR DRYING TEXTILE MATERIALS

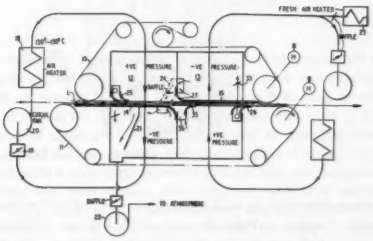
Malcolm Chaikin, Centennial Park, and Mstislav Nossar, Peakhurst, both of Australia, assignors to Unisearch Limited, New South Wales, Australia

Continuation-in-part of Ser. No. 50,527, June 29, 1970, abandoned. This application May 29, 1974, Ser. No. 474,172

Claims priority, application Australia, June 25, 1969, 56985/69

Int. Cl.² F26B *11/02, 13/00*

U.S. Cl. 34—122 **10 Claims**



1. Drying apparatus for drying a layer of loose fibres using a high velocity flow of drying air comprising mesh-like porous support means for conveying a layer of fibres to be dried along an elongated path of travel which mesh-like porous support means does not significantly interfere with the flow of drying air, means for producing the high velocity flow of drying air and for directing the flow of drying air against one surface of the layer of fibres so that it passes through the layer from the surface against which the drying air is directed to the opposite surface of the layer with the drying air passing through the layer transversely of the path of travel of the layer, and a perforated backing member arranged to support at least a portion of said porous support means and spaced from the layer fibres by said porous support means, said perforated backing member located only on the downstream side of the layer of fibres relative to the direction of flow of the drying air through the layer of fibres so that the flow of drying air to the upstream side of the layer is substantially unobstructed, and said perforated backing member having a plurality of holes therethrough distributed over its surface opposite the surface of the layer from which the drying air exists with the total area of the holes in its surface opposite the surface of the layer constituting 5 to 20% of the total area of said backing member.

3,913,242

PREHEATER FOR GRAIN DRYER

Kenneth C. Fackler, Anchor, and John O. Bradford, Gibson City, both of Ill., assignors to M & W Gear Company, Gibson City, Ill.

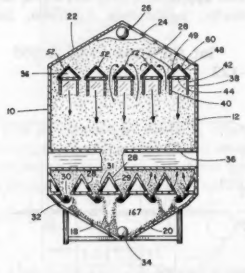
Filed Sept. 11, 1974, Ser. No. 504,997

Int. Cl.² F26B *17/12*

U.S. Cl. 34—170 **5 Claims**

1. In a portable continuous flow grain dryer of the type having an enclosed bin with a wet grain inlet at the top of said bin and a grain outlet at the bottom of said bin, said bin includ-

ing a plurality of spaced parallel horizontal hot fluid inlet ducts for directing a fluid drying medium downwardly through a bed of grain in said bin, a plurality of spaced parallel horizontal cold fluid inlet ducts for directing a fluid cooling medium upwardly through said bed of grain, said cold fluid inlet ducts positioned parallel to and below said hot fluid inlet ducts and spaced from one another to provide a plurality of grain discharges to the grain outlet fluid inlet means at one end of said inlet ducts, means for adding wet grain through said wet grain inlet, means for withdrawing dry grain from said grain outlet horizontal exhaust duct means intermediate said hot and cold fluid inlet ducts and perpendicular thereto to receive and exhaust fluid medium flowing from said hot inlet ducts in a concurrent direction to grain flow and also exhaust cold fluid medium flowing from said cold inlet ducts in a counter-



current direction to said grain flow, each of said exhaust duct means having outlets through said bin on opposite sides thereof, and means for providing hot fluid to said hot inlet ducts and cold fluid to said cold inlet ducts through said fluid inlet means at one end of said bin, the improvement comprising:

preheat exhaust ducts positioned over each of said hot fluid inlet ducts and coextensive therewith, each preheat exhaust duct being formed in part by a portion of a hot fluid inlet duct, each of said hot fluid inlet ducts including a substantially horizontal planar top and downwardly depending sides, said preheat exhaust ducts each including the planar top of said hot fluid inlet duct to form the bottom portion thereof and a perforated panel over and closed on said planar top to form a longitudinal duct, said preheat exhaust ducts being vented outside said bin.

3,913,243

GOLF SANDAL

Kenneth E. Arnold, and Joyce P. Arnold, both of Rancho Palos Verdes, Calif., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Feb. 20, 1975, Ser. No. 551,373

Int. Cl.² A43B

U.S. Cl. 36—2.5 AN **4 Claims**

1. A golf sandal in combination with a golf shoe having spike members extending downward from a sole section of said golf shoe, which comprises:

a. a lower flexible hard rubber sole;

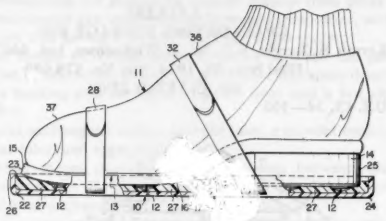
b. an upper planar soft rubber sole;

c. a first means of joining said upper planar soft rubber sole onto said lower flexible hard rubber sole, and said upper and lower soles formed in a shape of a conventional shoe sole having a forward sole portion, a shank portion and a rearward heel portion;

d. a top surface of said upper sole having a plurality of recessed openings therein;

e. said golf sandal having an outer peripherial sidewall of flexible hard rubber integrally joined to said lower sole;

f. said sole section of said golf shoe engaging said upper sole of said golf sandal, wherein said spike members insert downward into said plurality of said recessed openings;



g. a second means of securing said golf sandal to said golf shoe.

3,913,244

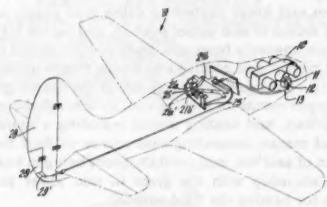
SINGLE ENGINE-SIMULATOR OF TWIN-ENGINE

Samuel H. Mason, Jr., 603 Virginia Terrace, Santa Paula, Calif. 93060

Filed June 14, 1973, Ser. No. 370,150

Int. Cl.² G09B 9/08

U.S. Cl. 35—12 B **5 Claims**



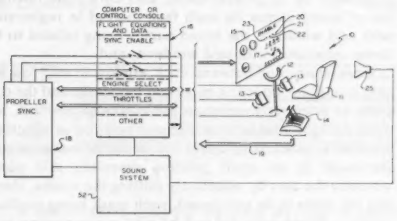
1. An aircraft-type twin-engine fuel-control simulator device comprising in combination: a single throttle shaft element mountable for first to and fro movement simulative of increased throttle and decreased throttle in simulation of separate throttle shafts for separate twin engines of an aircraft; a pivot element pivotably mounting a link pivotable on said throttle shaft element; two bilaterally separate throttle-fuel enrichment control lever means each for simulating a different one of dual throttle-positions and each for separately effecting said first to and fro movement of said shaft element; each of said separate throttle-fuel enrichment control-lever means including a separate throttle-lever means for simulating a throttle handle and for manual actuation of said single throttle shaft element, and a separate fuel-enrichment-lever means for simulating a fuel-enrichment handle and for manual actuation of said throttle shaft element; each of said separate throttle-lever means when moved in one predetermined direction each being movable of the pivotable link in one of second to and fro directions and thereby being simutaneously movable of said single throttle shaft element in its corresponding said first to and fro directions, each of said separate fuel-enrichment-lever means when moved in one predetermined direction each being movable of said single throttle shaft element in its corresponding said first to and fro directions, and when each of separate throttle-lever means and the separate fuel-enrichment-lever means is moved in reverse direction each respectively serving to move each of the pivotable link and accordingly also the single throttle shaft element in a reversely opposite direction of said first and second to and fro directions, and one of the bilaterally two separate throttle-fuel enrichment control-lever means being movable of the single throttle shaft element in one of said first to and fro directions and the other remaining one of the bilateral two separate throttle fuel enrichment control-lever means being movable of a single throt-

tle shaft means in an opposite one of said first to and fro directions, such that each of the two bilaterally separate throttle-fuel enrichment control-lever means is simulative of one of twin engines of an aircraft and such that jointly the two bilaterally separate throttle-fuel enrichment control-lever means modify the overall effect of each thereof on movement of said pivotable link and of said single throttle shaft element.

3,913,245
PROPELLER SOUND SIMULATION

Neil R. McCanney, Binghamton, N.Y., assignor to The Singer Company, New York, N.Y.

Filed Apr. 19, 1974, Ser. No. 462,344
Int. Cl.² G09B *9/02*
U.S. Cl. 35—12 Q **8 Claims**



1. An acoustic system for simulating sounds characteristic of the propellers of a multi-engine aircraft wherein the propeller sounds are modulated to produce the undulating droning sounds generated by the propellers as their speed is regulated during the continuous task of synchronizing the speed of all the propellers with a reference signal comprising:

a plurality of simulated aircraft controls, each for providing a control signal representative of the setting of one of said aircraft controls;

first combining means for combining one of said control signals with a phase error signal to produce an engine control signal;

a plurality of signal generators connected to receive said engine control signal, and for producing a plurality of output signals, each output signal having a characteristic which varies according to changes in said engine control signal;

selection means for receiving at least two of said output signals and for selecting one of said received output signals as a reference output signal;

generating means for providing a pulse signal at substantially random intervals;

second combining means for combining said reference output signal and said pulse signal to produce a synchronizing signal;

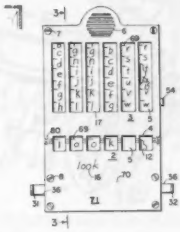
phase detection means for comparing one of said output signals to said synchronizing signal to produce said phase error signal; and

a sound generator responsive to said output signals for producing sounds characteristic of the propellers of a multi-engine aircraft, said produced sounds varying in response to variations of said characteristic of said output signal to produce the undulated droning sound characteristic of the propellers of a multi-engine aircraft.

3,913,246
TEACHING AND LEARNING AID

Grace A. Wahlberg, and Eric C. Wahlberg, both of 32 Eighth St., Stamford, Conn. 06905

Continuation-in-part of Ser. No. 372,657, June 22, 1973, abandoned, which is a continuation-in-part of Ser. No. 316,867, Dec. 20, 1972, abandoned. This application July 24, 1974, Ser. No. 491,542
Int. Cl.² G09B *5/04*
U.S. Cl. 35—35 C **11 Claims**



1. A teaching and learning aid for demonstration of the rudiments of language, science, and the like comprising a plurality of endless spaced tape means each having a multiplicity of character thereon, a housing provided with at least one group of aligned window openings and at least one access opening, said access opening and said window openings being provided with a tape support means that is the sole support of the respective tape means, one edge of said tape support means being integral with said housing, the construction and arrangement of said tape support means forming an access means between said housing and said tape support means for enabling said tape to be assembled between said tape support means and said housing without removal of said tape support means, each of said window openings coacting with a corresponding endless elongated tape means having said characters thereon whereby movement may be selectively imparted manually to each of said endless elongated tape means in said access opening to move the selected characters on the respective endless elongated tape means into said aligned window openings to form the selected language or science learning aid.

3,913,247
AUGER AND BLADE THEREFOR USEABLE TO MOVE MATERIALS SUCH AS SNOW AND THE LIKE

Walter Franklin Ruhl, Greenville, Ohio, assignor to Lambert Corporation, Dayton, Ohio

Filed Apr. 12, 1974, Ser. No. 460,458
Int. Cl.² E01H *5/09;* **B65G** *33/30, 33/00*
U.S. Cl. 37—43 E **13 Claims**

1. A snow or material blower comprising:

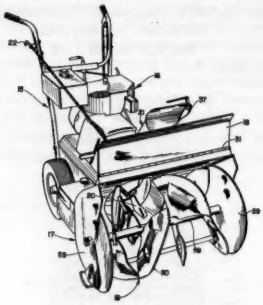
a housing having an open bottom and open front;

a rotatable shaft mounted on said housing; and

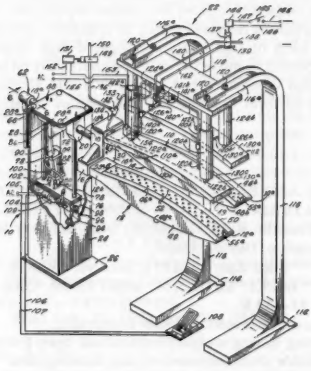
an auger flight mounted on said shaft;

said auger flight including at least one leading blade and one trailing blade, each blade being stiff and inflexible, each blade being approximatetly triangularly fan shaped and having leading, trailing and inner apex portions, said inner apex portions being directly attached to said shaft, the blade edges between said leading and trailing apex portions which extend to said inner apex portion forming a small obtuse angle, and the outer trailing apex portion of a leading blade being directly attached to an adjacent outer leading apex portion of a trailing blade to form a helical flight, the blades being similar in size and form, the inner apex portions being directly attached at predetermined spaced positions along and around the shaft conforming to a predetermined transverse angular dispo-

sition of the blades with respect to the shaft, the outer connection of the outer apex portions being therebetween with respect to the shaft and forming therewith an integrated structural unit.



3,913,248
SEAM BUSTER
Hugh L. Thompson, P.O. Box 2329, 807 Citizens Tower, Waco, Tex. 76703
Filed Sept. 6, 1974, Ser. No. 503,836
Int. Cl.² D06F *69/00*, *71/34*
U.S. Cl. 38—1 B **10 Claims**



1. A seam buster for pressing open the inner and outer leg seams of a pair of pants comprising: support means; a shaft; means rotatably securing said shaft to said support means; first and second pressing bucks; a head secured to said shaft; means securing said pressing bucks to said head in spaced parallel relation; convex pressing surfaces on opposite sides of each of said pressing bucks; first and second pressing heads; a concave pressing surface on each of said pressing heads; heater means in heat exchange relation with said concave surfaces; means supporting said pressing heads; and means to move said concave surfaces on said pressing heads toward said convex surfaces on said pressing bucks.

3,913,249
BRAND NAME SHOPPING GUIDE
Walter Kaslow, 380 Lafayette St., New York, N.Y. 10003
Filed Aug. 22, 1974, Ser. No. 499,404
Int. Cl.² G09F *7/10*
U.S. Cl. 40—65 **6 Claims**

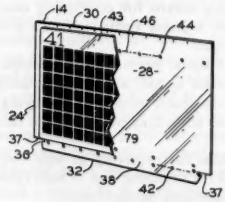
1. A shopping guide comprising:

A. a core plate,

B. a pair of identical display panels sandwiching said core plate, each panel having a row of windows thereon and a presentation area parallel to said row, said presentation area having formed thereon a general list of items, each item in the general list being disposed adjacent a respective window in the row and identifying a product to be purchased by its generic name, said core plate having a list of brand names on each face thereof in registration with said windows, the brand names being related to the items associated with said windows; and

C. a mask interposed between each window in said row and said core plate, coacting means on the masks and the core plate to selectively maintain the masks in position, said mask being shiftable from a closed position in which the window is blocked to cover the brand name associated therewith to an open position revealing said name, whereby the user by selectively shifting the masks, identifies the items to be purchased, each mask being confined within a frame area defined by ribs encompassing each window and formed in the rear of each of said panels.

3,913,250
FILING SYSTEM AND ELEMENTS THEREFOR
Arthur T. Spees, 14802 Ridgeboro Place, Tustin, Calif. 92680
Continuation-in-part of Ser. No. 883,113, Dec. 8, 1969, Pat. No. 3,785,520, which is a continuation-in-part of Ser. No. 612,202, Jan. 27, 1967, abandoned, which is a continuation-in-part of Ser. No. 328,798, Dec. 9, 1963, Pat. No. 3,301,263. This application Oct. 10, 1972, Ser. No. 296,020
Int. Cl.² B42F *17/00*
U.S. Cl. 40—78 **19 Claims**



1. A filing system of the class described, the combination of:

a. a file receptacle having spaced apart longitudinal side walls for containing a group of backing cards positioned one behind the other;

b. a plurality of backing cards supported in said receptacle in side-by-side relationship, one behind the other and having substantially planar bodies and side, bottom and top edges;

c. fulcrum means positioned along a fulcrum line near the bottom edges of said backing cards and cooperatively engaging adjacent backing cards contained in said receptacle;

d. means in said receptacle operating to position said backing cards and said fulcrum means to cause relative pivotal movement of adjacent backing cards about said fulcrum line when a number of said backing cards are caused to converge at their bottom edges and thus cause fanning of a limited number of backing cards; and

e. data element support means for supporting data elements which may be positioned between adjacent backing cards to prevent such data elements from movement into a position between said backing cards and said fulcrum means.

3,913,251
SELF-RETAINING MAGAZINE PLUG

Val A. Browning, Ogden, Utah, assignor to Browning Arms Company, Morgan, Utah

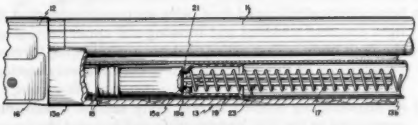
Filed Jan. 28, 1974, Ser. No. 437,172

Claims priority, application Canada, Feb. 1, 1973, 162609

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F41C *25/08, 25/00*

U.S. Cl. 42—49 A **7 Claims**



1. A self-retaining plug for insertion through an apertured spring follower into a magazine tube to limit the cartridge holding capacity of the magazine, said plug comprising a shank of reduced diameter for readily slidable insertion through the aperture in the spring follower and means integral with one end of said shank which retain that end of said shank from passing through the aperture except upon the application of substantial intentional pressure axially of said shank.

6. In a shotgun having a magazine tube, an improved magazine limiting assembly comprising:

a self-retaining plug member having a shank of reduced diameter and bifurcated, resiliently separated means which is integral with one end of the plug and which is of generally enlarged diameter when separated; and

a spring follower slidably arranged in the magazine tube, said follower having a concave inner end surface and an aperture formed generally concentrically therethrough, said aperture being dimensioned to allow said shank portion to be freely slidable therethrough but to admit said means of enlarged diameter only when the halves of said bifurcated portion are pressed together, said concave surface being adapted to press said halves together upon application of substantial intentional pressure axially on said shank.

3,913,252
SHIELD FOR BALLISTIC CUTTERS

Daniel D. Musgrave, 8201 Caraway St., Cabin John, Md. 20731

Filed Nov. 23, 1973, Ser. No. 418,302

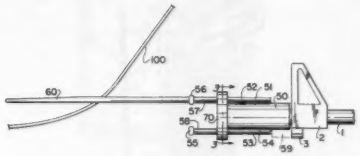
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F41C *27/04*

U.S. Cl. 42—90 **9 Claims**

1. In a ballistic cutting implement for mounting on a muzzle of a firearm, shield means positionally adapted for deflecting solid particles moving generally toward the rear of said firearm, said shield means having a portion adapted for folding.

5. A ballistic cutting implement comprising: a housing adapted to be fixed on a muzzle of a firearm with the longitudinal axis of said firearm substantially coincident with one axis of said housing; a first lug affixed to said housing with one axis of said lug substantially parallel to but not coincident with said longitudinal axis, said lug being positionally adapted for engagement with a strand to be cut; a second lug affixed to said housing with one axis of said second lug substantially parallel to but not coincident with said longitudinal axis, said second lug being positionally adapted for engagement with a strand to



be cut, and the respective said axes of said first lug, said second lug, and said firearm being positioned in the same plane; detent means on at least one said lug positionally adapted for maintaining the engagement of said lug with said strand; and shield means positionally adapted for impeding particles deflected toward the rear of said firearm when material is cut ballistically.

3,913,253
PROCESS OF REMOVING SULFUR OXIDE FROM EXHAUST GASES

Harald Juntgen, Essen-Heisingen; Karl Knoblauch, Essen; Gunther Gappa, Gelsenkirchen-Buer, and Jurgen Schwarte, Essen-Rellinghausen, all of Germany, assignors to Bergwerksverband GmbH, Essen, Germany

Filed Oct. 16, 1970, Ser. No. 81,350

Int. Cl. C01b *17/00;* **B01j** *9/04, 9/08, 9/12, 9/16, 9/20*

U.S. Cl. 423—244 **9 Claims**

1. Process of treating exhaust gases containing water vapor, oxygen and sulfur oxide, comprising the steps of moving a stream of granular carbon-containing adsorbent through an elongated adsorption zone having an adsorbent inlet end and an adsorbent outlet end; and moving said exhaust gases transversely through said stream of granular carbon-containing adsorbent material in said adsorption zone in such a manner that in the region of said adsorption zone nearer to said adsorbent inlet each volume unit of said adsorbent stream is traversed by a greater amount of exhaust gases per unit of time than in the region of said adsorbent zone nearer to said adsorbent outlet.

3,913,254
FISH HANDLING DEVICE

Mario J. Puretic, 259-6th Ave. North, Tierra Verde, Fla. 33715

Continuation-in-part of Ser. No. 380,820, July 19, 1973, abandoned. This application Aug. 12, 1974, Ser. No. 496,446

Int. Cl.² A01K *81/04*

U.S. Cl. 43—6.5 **12 Claims**

1. A fish handling device for lifting fish upwardly out of a fish-containing space, said device comprising:

a frame;

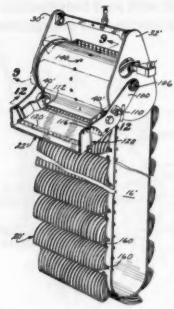
a roller mounted on said frame for rotation about a horizontal axis;

a flexible endless belt drivingly looped about said roller and freely depending therebelow into said fishcontaining space, said belt being suspended solely from said roller;

a plurality of fish-moving baskets attached to said belt at spaced points therealong;

a chute on said frame spaced outwardly of said baskets; and

power-operated means on said frame for rotating said roller to thereby cause said baskets to continuously collect and then raise fish out of said fish-containing space onto said chute.

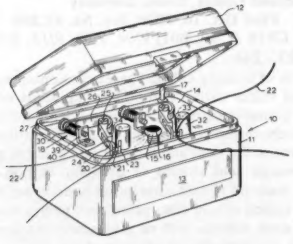


3,913,255

FISHING LINE STRIKE SIGNALING APPARATUS

John H. B. Fillmen, 701 Terrace Blvd., Orlando, Fla. 32803

Filed Sept. 23, 1974, Ser. No. 508,188
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **8 Claims**



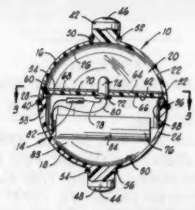
1. A fishing line strike signaling apparatus comprising in combination:
   a. a base;
   b. a pair of line gripping members mounted to said base for gripping a fishing line therebetween, a line being adapted for separating said line gripping members, one line gripping member being pivotably mounted to said base to pivot onto and off of the other line gripping member;
   c. electrical signaling means operatively connected across said line gripping members for signaling when said line gripping members contact each other;
   d. an eccentrically mounted member for separating said line gripping members when rotated against said pivotably mounted line gripping member;
   e. spring means connected to said pivotably mounted member for applying the line gripping pressure driving said pair of line gripping means together; and
   f. pressure adjusting means for varying the pressure of said spring means thereby varying the line gripping pressure between said pair of line gripping members, whereby the line gripping means can be varied as desired.

3,913,256

ILLUMINATED FISHING FLOAT APPARATUS

Earl F. Morris, Moore, and Jimmy L. Croft, Midwest City, both of Okla., assignors to Earl F. Morris, Moore, Okla.

Filed Dec. 17, 1973, Ser. No. 424,941
Int. Cl.² A01K 93/00
U.S. Cl. 43—17.5 **1 Claim**



1. A fishing float apparatus connectable to a line and floatable in a body of water or the like, comprising:
   a hollow, spherically shaped float body, including
   a hemispherically shaped first body section constructed of light emitting material and forming the upper section of the float body, a first cylindrical protrusion being formed on a portion of the outer surface of the first body section of the float body and extending a distance therefrom;
   a hemispherically shaped second body section removably connected to the first body section and forming the lower section of the float body, a second cylindrical protrusion being formed on a portion of the outer surface of the second body section of the float body and extending a distance therefrom. the first and the second body sections being connected together and forming the hollow spherically shaped float body;
   means engaging portions of the first and the second body sections generally near their connection and forming a seal substantially preventing water from leaking into the hollow portion of the float body;
   an O-ring removably secured about the first protrusion, for the O-ring securing a portion of the line to the float body between the O-ring and the first protrusion in one position;
   an O-ring removably secured about the second protrusion, for securing a portion of the line to the float body between the O-ring and the second protrusion in one position;
   a reflector, having a reflector surface, disposed within a portion of the hollow portion of the float body;
   a plate disposed in the hollow portion of the float body, having a portion connected to the float body, the reflector being connected to the plate and supported thereby with the reflector surface generally facing the light emitting portion of the upper section of the float body, the plate encompassing and enclosing a substantial portion of the hollow portion of the second body section and an aperture being formed through a portion of the plate;
   a light emitting diode, having a portion disposed through the aperture in the plate and projecting into the upper section above the reflector and a portion connected to the plate and supported by the plate within the hollow portion of the float body for emitting light, when energized through the upper section of the float body and the reflector surface reflecting the light through the upper section of the float body; and
   means disposed in the hollow portion of the second body section and connected to the light emitting diode for energizing the light emitting diode, the plate enclosing the energizing means within the hollow portion of the second body section, said means comprising:
   an electrical power source connected to the light emitting diode;

means connected to the electrical power source supporting the electrical power source in the float body hollow portion; and

a current limiting resistor connected to and interposed between the electrical power source and the light emitting diode limiting the current connected to the light emitting diode.

3,913,257

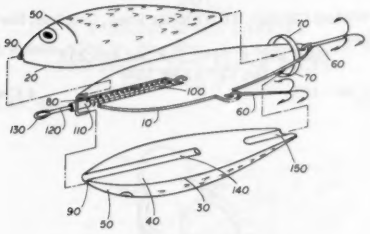
FISH LURE WITH EXCHANGEABLE SIDE PANELS

Francis L. Colgan, Binghamton, N.Y., assignor to Raymond Lee Organization Inc., a part interest

Filed Nov. 20, 1974, Ser. No. 525,300

Int. Cl.[2] A01K *85/00*

U.S. Cl. 43—42.09 **4 Claims**



1. A fish lure which can be used to simulate the appearance of a plurality of bait fish comprising:

a flat elongated center plate bearing fishhooks extending outwardly from its periphery away from the center of the plate;

a plurality of left body panels, each left panel having a flat surface and an outwardly curving convex surface, each left panel having a periphery approximating the outline of the body of a fish;

a like plurality of right body panels, each right body panel taking the form of a mirror image of a corresponding left body panel; and

means disposal on the center plate and cooperating with a left body panel and its corresponding right body panel and detachably securing the panels to the plate in a manner that the plate is sandwiched between the flat surfaces of the plates to form a structure simulated the appearance of the body of a fish with fishhooks extending outwardly therefrom, said means including two like opposed bands disposed on opposite sides of the plate near its rearmost extremity, each band encircling the rear portion of one of the body panels and thus keeping it pressed against the plate.

3,913,258

COLLAPSIBLE LIVE ANIMAL TRAP

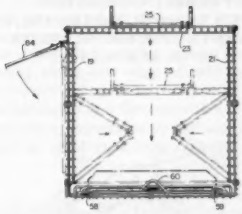
Anthony J. Souza, Lancaster, and Harlan W. Martin, New Holland, both of Pa., assignors to Woodstream Corporation, Lititz, Pa.

Continuation-in-part of Ser. No. 251,790, May 9, 1972, Pat. No. 3,834,063. This application July 23, 1974, Ser. No. 490,951

Int. Cl. A01m *23/02*

U.S. Cl. 43—60 **8 Claims**

1. A collapsible live animal trap comprising a generally box-like cage including a top section; a bottom section; opposing side walls hingedly coupled along top and bottom edges thereof to both said top and bottom cage sections respectively; opposing end walls hingedly coupled along an edge thereof to one of said top and bottom cage sections, at least one of said end walls being defined by a controllable door means for selectively providing an entrance and egress passage to and from said cage to effect trapping of an animal within the interior of said cage; and wherein each of said side walls further incorporates a hinge axis therein disposed parallel to said top and bottom edges and substantially equidistant therebetween about which said side walls are foldable; whereby



said cage can be collapsed into a flattened state for transport by folding each said endwall inwardly about said hinge coupling along said edge thereof, by inwardly displacing said hinge axis of each sidewall such that each sidewall is folded upon itself, and by thereafter displacing said top and bottom cage sections towards one another.

3,913,259

COMPOSITION AND DEVICE FOR CAPTURING COCKROACHES

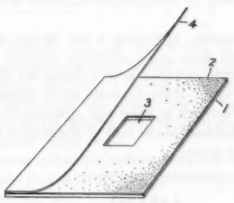
Akira Nishimura; Hiroshi Akamatsu; Sentaro Negoro, all of Ako, and Yasutoshi Yoshida, Kakogawa, all of Japan, assignors to Earth Chemical Company, Limited, Ako, Japan

Filed May 14, 1973, Ser. No. 360,021

Claims priority, application Japan, May 26, 1972, 47-62290; June 5, 1972, 47-66606; June 6, 1972. 47-67058; Nov. 21, 1972, 47-134736; Nov. 21, 1972, 47-117407

Int. Cl.[2] A01M *1/14*

U.S. Cl. 43—114 **9 Claims**



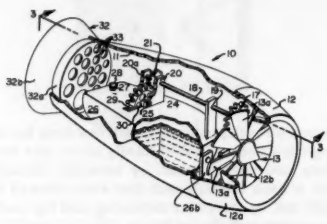
1. A device for capturing various sizes of cockroaches which comprises a composition-carrying means and a coating layer of a cockroach-capturing composition comprising a mixture of softener and tackifying resin in the weight ratio of 3–9:7–1 and 0–10 percent by weight of rubber, based on the total weight of said mixture and said rubber, and having a viscosity of 40 to 2,100 poises at 25°C, the composition having the properties of up to 50 cm rolling distance on the composition in terms of the result of a steel ball rolling test conducted at an angle of inclination of 30° by using a steel ball of 11 mm in diameter and 5.40 g in weight and up to 5 cm rolling distance on the composition in terms of the result of a plastic ball rolling test conducted at an angle of inclination of 30° by using a plastic ball of 14 mm in diameter and 1.3 g in weight, said softener being selected from the group consisting of liquid polybutene, liquid polyacrylate, lower-molecular-weight phenol-formaldehyde resin, lower-melting styrene resin, lower-molecular-weight polyisobutylene; processed oil and mineral oils; dicetyl phthalate, dioctyl phthalate, dibutyl phthalate; tung oil, oiticica oil, linseed oil, perilla oil, hempseed oil,

soybean oil, cod oil, cuttlefish oil, castor oil, olive oil, camelia oil, pine oil, rosin oil and pine-tar, said coating layer being formed on at least one surface of the composition-carrying means to be exposed to the passage of cockroaches.

3,913,260
TOY BUBBLE GENERATOR

James C. Corbett, 833 Roberta St., Salt Lake City, Utah 84111

Filed May 17, 1974, Ser. No. 470,818
Int. Cl. A63I *33/28*
U.S. Cl. 46—8 **8 Claims**

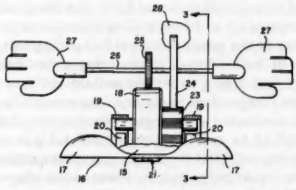


1. A bubble generator comprising
a housing having inlet and outlet openings through opposite ends thereof;
a reservoir in the housing adapted to contain bubble-forming liquid;
a spur gear in the housing, having teeth around the periphery thereof and openings therethrough radially spaced inside the teeth and adapted to be moved into and out of the reservoir, whereby a film of bubble-forming liquid is formed across each said opening as it moves into and out of said reservoir, when said reservoir has bubble-forming liquid therein;
an orifice plate spaced from said spur gear and positioned in the outlet opening of the housing, said orifice plate having a plurality of openings of different therethrough; and
means in the housing, including a fan having a fan blade coupled to said spur gear, whereby rotation of the fan blade rotates the said spur gear to force air through said opening, such that bubble-forming liquid entrained in the air is carried through at least one opening in the orifice plate to form bubbles at the side of the orifice plate opposite to the spur gear.

3,913,261
TOY FIGURE

Walter P. Doe, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Dec. 6, 1972, Ser. No. 312,585
Int. Cl.² A63H *5/00*
U.S. Cl. 46—98 **8 Claims**

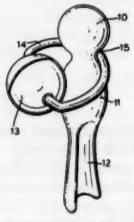


1. A toy figure comprising:
a. a hollow body having a base broad enough to support said body in an upright position;
b. a traction wheel supported for rotation within said body and housed substantially within said body to extend slightly below said base so said body can roll on said wheel and skid on said base;
c. a knurled hub on said traction wheel;
d. a resilient sounder spring having a free end engaging said knurled hub and disposed to make a sound on rotation of said wheel in either direction;
e. a friction wheel resting on top of said traction wheel to rotate with said traction wheel;
f. an axle for said friction wheel extending out of opposite sides of said body; and
g. simulated hands on said axle for rotating as said body moves;

3,913,262
TOY

David William Chisnall, 11, Vicarage Road, Lingfield, Surrey, England

Filed Aug. 6, 1974, Ser. No. 495,237
Int. Cl.² A63H *5/00*
U.S. Cl. 46—193 **4 Claims**

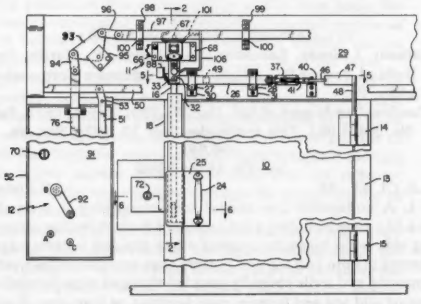


1. An infant's toy or plaything comprising a stem component for hand-holding, said stem comprising a bulbous head portion, a trunk portion and a waisted neck portion joining said head and trunk portions, a ring member carried by and captive but freely rotatable on said stem around said waisted neck portion, and a hollow rattle ball carried by said ring member.

3,913,263
LOCKING AND UNLOCKING MECHANISM FOR HINGED DOORS

Gerald L. Butt, Independence, Ky., assignor to Stewart-Decatur Security Systems, Inc., Covington, Ky.

Filed May 23, 1974, Ser. No. 472,533
Int. Cl.² E05B *47/00*
U.S. Cl. 49—16 **15 Claims**



1. A locking and unlocking mechanism for locking and unlocking a hinged door comprising in combination: a door

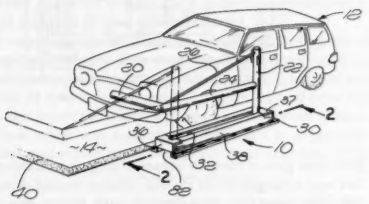
hingedly supported at one end; a bar being positionable relative to the other end of said door to provide locking and unlocking conditions; lock means on said door cooperating with said bar in the locking condition; bias means for forcing said door open in the unlocked condition; securing means operatively connected with said bar to move said bar from the locked condition to the unlocked condition; control means having three operating control positions; link means connecting said control means with said securing means wherein movement of said control means to the respective control positions respectively positions said securing means whereby two control positions provide for unlocking and opening of said door; and support rail means mounted independent of said door and movable transverse to said bar when said door is open, wherein said rail means is moved to said bar in the unlocked condition when the door is open.

3,913,264

PARKING SPACE BARRIER

Isak Kohen, 9330 W. Pico Blvd., Los Angeles, Calif. 90035

Filed June 21, 1974, Ser. No. 481,503
Int. Cl.² E01F *13/00*
U.S. Cl. 49—49 **5 Claims**



1. A parking space barrier comprising a hollow base having a longitudinal slot therein, a vertical post movably mounted in said base for reciprocable longitudinal movement with respect to said base to blocking and non-blocking positions and projecting upwardly through said slot, resilient means in said base engaging said post for resiliently urging longitudinal movement of said post in one direction, a blocking arm mounted for movement in unison with said post, and locking means for fixedly preventing longitudinal movement of said post while in blocking position.

3,913,265

HINGED WINDOW WITH SAFETY RELEASE MECHANISM

Yale W. Ehret, Elkhart, Ind., and Adam Niessner, Winnipeg, Canada, assignors to The Adams & Westlake Company, Elkhart, Ind.

Filed Sept. 30, 1974, Ser. No. 510,543
Int. Cl.² E05B *65/10*
U.S. Cl. 49—141 **9 Claims**

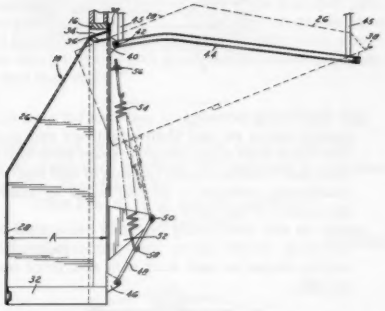
1. A window construction which comprises a sash which includes a generally rectangular glass panel supporting sash of a size for closing an opening in a generally vertical wall, means at the one side of said opening mounting said sash frame for swinging movement in a direction outwardly of said opening, and a latch assembly for releasably holding the sash in the opening when the sash is in a closed position, which latch assembly includes a keeper member mounted on the side of the sash frame which is opposite the mounting means and a latch bolt mechanism mounted adjacent the corresponding edge of said opening which includes a housing and a retractable spring pressed keeper engaging bolt mounted therein, a release bar swingably mounted on said housing, said release bar extending along said edge of said opening where it is accessible for manual operation on the inside of said wall, said release bar having an arm thereon with a cam surface and said bolt having means engageable by said cam surface for retracting said bolt to withdraw it from said keeper member.

3,913,266

GARAGE DOOR EXTENSION STRUCTURE

Raymond P. Smith, 30785 Red Maple Lane, Southfield, Mich. 48075

Filed Apr. 14, 1972, Ser. No. 244,107
Int. Cl.² E06B *3/00*; E05F *1/08*
U.S. Cl. 49—200 **3 Claims**



1. An overhead door for an opening in a storage building such as a garage for enlarging the protected space within the structure when the door is closed which comprises:

a. a pair of spaced side panels having a straight inner edge, said panels increasing in dimension from top to bottom to provide an outer edge,

b. a closure panel extending between said outer edges of said side panels to provide a three-sided closure open at the bottom, and

c. means to mount said panels for pivotal movement from a closed position overlying a door opening of a structure to an open and overhead position inside and above the floor of said structure wherein said opening is unobstructed.

3,913,267

RAILWAY CAR DOOR CONTROL MECHANISM

Willis H. Knippel, Palos Park, Ill., and Walter J. Marulic, Gary, Ind., assignors to Pullman Incorporated, Chicago, Ill.

Filed Aug. 20, 1973, Ser. No. 389,933
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² E05D *15/10*
U.S. Cl. 49—220 **10 Claims**

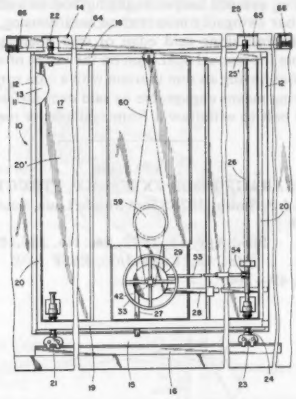
7. A railway car having a side including a frame and a door opening, a door slideable relative to said opening from a closed position to an open position on one side of said opening, locking bolt means on said door movable into engagement with said frame in the closed position, a shaft rotatably mounted on said door and extending laterally outwardly of

said door, an actuating means connected to said bolt means for engaging and disengaging the same from said frame, the improvement comprising:

a mechanism for moving said door between open and closed positions, including:

an anchoring member supported on said frame,

a force multiplying member rotatably mounted on said door and connected to said anchoring member,



said shaft being mounted on said door for axial movement, keying means on said shaft selectively engageable with said force multiplying member upon axial movement of said shaft whereby during rotation of said shaft said force multiplying member is rotated so as to effect sliding movement of said door, and

means on said shaft being operably disengaged from said actuating means during selective engagement of said keying means on said shaft with said force multiplying member.

3,913,268

RAILWAY CAR DOOR CONTROL MECHANISM

Thomas G. Paterson, Calumet Twp., Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed Aug. 20, 1973, Ser. No. 389,932

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² E05D *15/10*

U.S. Cl. 49—220 **9 Claims**

1. A vehicle door movable laterally into and out of the opening of a door frame and slidable between a position over the opening and one side of said opening, a rod rotatably connected to said door, crank arms on said rod rotatably connected to said door frame to provide for lateral movement of said door, locking bolt means slidably connected to said door and movable into and out of locking relation relative to said door frame, the improvement comprising,

a shaft rotatably supported on said door,

means on said shaft for rotating the same,

actuating means on said door,

first linkage means connected to said actuating means and said rod for rotating the same in response to movement of said actuating means,

second linkage means connected to said bolt means and to said actuating means for moving said bolt means in response to movement of said actuating means,

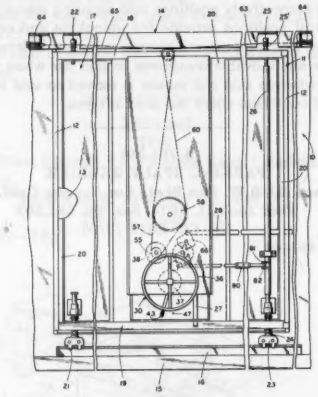
a mechanism for moving said door to one side of said opening including a tension member anchored on said frame adjacent said opening,

a rotatable member on said door connected to said tension member whereupon rotation of said rotatable member said door is moved between a position over the opening and a position on one side of the opening,

said actuating means including a first driven member,

a second driven member connected to said rotatable member for rotating the same, each of said driven members being laterally spaced apart in a vertical plane and arranged substantially parallel to the plane of said door,

a drive member rotatable in response to rotation of said shaft, and



a gear-type power transfer means engaging said drive member and arranged to be shifted relative to said drive member into selective engagement with either one of said laterally spaced apart first and second driven members so as to effect rotatable driving of either one of the engaged driven members upon rotation of said shaft and drive member.

3,913,269

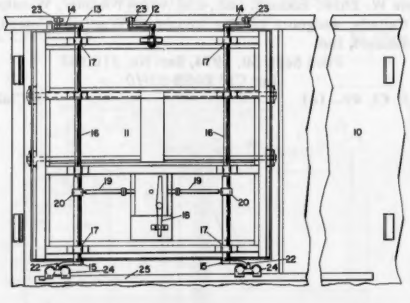
SAFETY CRANKS FOR PLUG DOORS

Irving D. Ross, Jr., Barrington, Ill., assignor to Youngstown Steel Door Company, Cleveland, Ohio

Continuation of Ser. No. 347,677, April 4, 1973, abandoned. This application Mar. 11, 1974, Ser. No. 441,151

Int. Cl.² E05D *15/10*

U.S. Cl. 49—220 **1 Claim**



1. A plug rail car door comprising:

a door member;

a door retainer;

a door track;

a pair of connection pipes rotatably secured to said door member;

operating crank assembly means attached to each end of said connection pipes;

rollers secured to said operating crank assembly means at the lower end of said connection pipes for supporting said door for sliding movement along said door track;

rollers attached to said operating crank assembly means at the upper end of said connection pipes for guiding the top of the said door along said door retainer;

actuating means attached to said door for rotating said connection pipes to cause said door to move into and out of the door opening;

said door retainer containing copes so located as to accept said connection pipes when said door has moved into said door opening in closed position;

the improvement comprising a safety crank assembly pivotally mounted on said door intermediate said operating crank assembly means;

said door retainer also containing a coped out section so located to accept the shaft of said safety crank assembly when door is in closed position;

said safety crank assembly containing a safety crank longer than the operating cranks of said operating crank assembly means so that the said safety crank does not align with its coped out portion of said door retainer at the same time that the said operating cranks of said operating crank assembly means align with their respective coped out portions of said door retainer;

said safety crank assembly prevents said door from disengaging from said door retainer during opening or closing movement of said door by being in a non-aligned position with its respective coped out portion of said door retainer in the event said door becomes unsupported at said door track when said operating cranks are in alignment with their respective coped out portions of said door retainers.

3,913,270

INTERLOCKING DEVICE OF DOORS

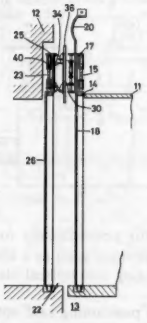
Gentaro Kumagai, Osaka, Japan, assignor to Gentaro Kumagai, Osaka, Japan

Filed July 23, 1973, Ser. No. 381,560

Claims priority, application Japan, July 25, 1972, 47-4776183

Int. Cl.² E05F *17/00*

U.S. Cl. 49—360 **1 Claim**



1. An interlock apparatus for contemporaneously opening a first door in a movable frame and a second door in a stationary frame when the movable frame is positioned directly behind the stationary frame, and for controlling movement of the movable frame, said apparatus comprising:

a first opening means attached to said first door for opening said first door;

electromagnet means attached to said first opening means for being energized when said first door is in position to be opened;

guide means adjacent said second door for guiding the opening of said second door, said guide means having a first hole therethrough;

mounting means attached to said second door for connecting said second door to said guide means, said mounting means having a second hold therein adapted to align with the first hole in said guide means when said second door is closed;

attraction means pivotally attached to said mounting means opposite said electromagnet means for pivoting toward said electromagnet means when said electromagnet means is energized and for pivoting against said mounting means under its own weight when said electromagnet means is not energized;

a locking shaft slidably fitted through said two holes and attached to said attraction means for movement therewith, whereby energizing said electromagnet means will attract said attraction means thereto, causing said locking shaft attached to said attracting means to withdraw from said holes; and whereby de-energizing the electromagnet means will cause the attraction means to pivot away from the electromagnet under its own weight toward the mounting means forcing the locking shaft through said two holes; and

lock confirmation means aligned with said two holes on the opposite side of said first hole from said second hole engageable with said locking shaft when said shaft penetrates said second hole for controlling the movement of said movable frame, whereby said movable frame is movable only when said lock confirmation means is engaged by said lock shaft.

3,913,271

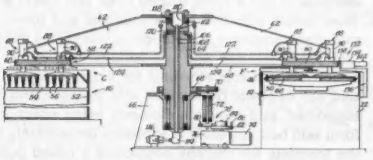
APPARATUS FOR MACHINING WORK PIECES

Stephen A. Boettcher, Deerfield, Ill., assignor to Speedfam Corporation, Des Plaines, Ill.

Filed Feb. 4, 1974, Ser. No. 439,317

Int. Cl. B24b *7/04*

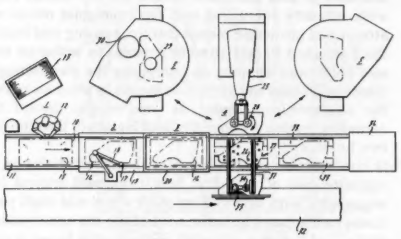
U.S. Cl. 51—5 R **9 Claims**



1. Apparatus for finishing the surface of work pieces and defining a plurality of horizontally spaced apart work stations arranged in a circular pattern, comprising discrete machines respectively disposed at certain of said work stations, at least two of said machines each including a rotatable member with a horizontal operating surface for engagement by work pieces, carrier means supported independently of said machines and including a circular carrier member revolvable horizontally above said work stations, a plurality of circumferentially spaced apart groups of horizontally disposed plate means with the number of groups corresponding to the number of said work stations and to which work pieces are adapted to be secured on the underside thereof, a plurality of groups of vertically disposed power actuated means carried by said carrier means and respectively connected to said plate means for selectively raising and lowering the latter, each group of said power actuated means selectively serving to transfer the associated group of said plate means and work pieces secured thereto progressively from one of said work stations to another of said work stations upon movement of said carrier means, and the groups of said power actuated means overlying said two machines selectively serving to apply downward pressure on said plate means to forceably urge the work pieces

secured thereto against said horizontal operating surfaces of said rotatable members.

3,913,272
TRIM SEPARATION
Roger E. Johnson, Westland, and Joe Y. Sawai, Dearborn Hts., both of Mich., assignors to Ford Motor Company, Dearborn, Mich.
Division of Ser. No. 368,399, June 8, 1973, Pat. No. 3,860,125. This application June 26, 1974, Ser. No. 483,199
Int. Cl.² B24B 9/10, 49/00
U.S. Cl. 51—5 C 3 Claims



1. A grinding apparatus with provision for pre-evaluation and pre-conditioning of glass templates, comprising:

a. first means for moving and supporting glass brackets along a linear path, said means having a continuous porous flexible membrane with one side for supporting and conveying said glass brackets to a handling and separating station, said brackets having been previously cut and severed to define a glass template and glass trim,

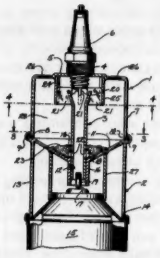
b. second means having a support for revolving a glass template about a pivot spaced from said linear path,

c. third means effective to pre-evaluate and pre-condition said glass templates at a station adjacent said linear path, said pre-evaluation and pre-conditioning means having selectively movable elements for acting against a side of said belt opposite from which said template and trim are supported, said movable elements being effective to deform said belt upwardly in locations immediately beneath the template for thereby promoting a raised position of the template out of the plain of the trim, said pre-evaluation and pre-conditioning means further having a device in said raised plane for sensing the presence of unwanted attached trim at least at three locations about said template periphery, said device being programmed to automatically shift said template to a predetermined position in said raised plane if no unwanted trim is detected, said pre-evaluation and pre-conditioning means hvaing controls effective to de-energize said third means if said device senses rigidly clinging glass trim at any of said three locations on said template and also to de-energize said third means if broken voids in the periphery are sensed at any of said three locations,

d. fourth means having a robot for mechanically and automatically carrying said raised template to said rotary support, said fourth means having a control effective to de-energize said robot if broken voids are present in said glass template interior from the edge contour of said template, and

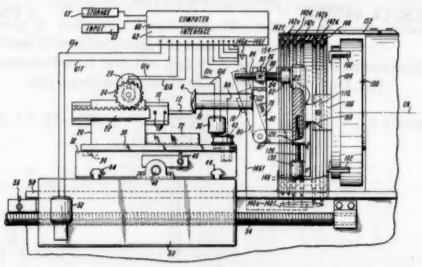
e. grinding means effective to continuously bring abrasive material against said template periphery as said template is moved by said rotary support, said grinding means having a control effective to sense the presence of rigidly clinging glass trim at the edge of said template which were not sensed by said third means.

3,913,273
SPARK PLUG CENTER
Karl J. Romanowicz, Jr., 7709 W. Bobolink Place, Milwaukee, Wis. 53218
Filed Apr. 23, 1973, Ser. No. 353,546
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B24C 3/34
U.S. Cl. 51—8 SP 10 Claims



1. A spark plug cleaner comprising a sand blast nozzle, means to support a spark plug with its face aligned with the discharge from said nozzle, a canister of pressurized gas, and adapter means to mount said nozzle upon said canister of pressurized gas for operating the nozzle.

3,913,274
METHOD AND APPARATUS FOR MAKING INTEGRATED MULTIFOCAL LENSES
Morgan B. Raiford, 705 Juniper St. NE., Atlanta, Ga. 30308; Charles R. Reeves, 3457 Sabrina Court, and Harold R. Ingle, Jr., 2665 Jamerson Road NE., both of Marietta, Ga. 30060
Filed Aug. 9, 1974, Ser. No. 496,329
Int. Cl.² B24B 13/00, 1/00, 17/00
U.S. Cl. 51—58 29 Claims



6. Apparatus for automatically forming a multifocal lens from an optical element such as a lens blank comprising:

means for securing said optical element for rotation about an axis,

first means for positioning said optical element in a plane, tool means for shaping said optical element,

means for positioning said tool means adjacent said optical element surface,

means for moving said tool means in an arc about a pivot axis, said pivot axis intersecting said rotation axis,

means for varying the distance between said tool means and said pivot axis to establish various radii of curvature for said optical element, and

said tool means positioned on one side of said optical element, the point of intersection of said rotation axis and said pivot axis positioned on the other side of said optical

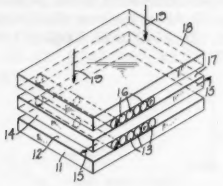
element and said pivot axis perpendicular to said rotation axis.

3,913,275

LAPPING, PRESSURE GRINDING AND FLASH ROLL APPARATUS AND METHOD

Thomas Scott Brawley, 15 Dogwood Court, Cromwell, Conn. 06416

Filed Aug. 10, 1973, Ser. No. 387,498
Int. Cl.² B24B *5/20*
U.S. Cl. 51—59 R **6 Claims**



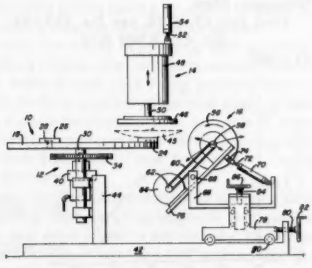
1. Apparatus for conditioning the rolling surfaces of rolling bearing elements comprising, at least two plates having facing complementary surfaces defining at least two opposite sides of a space corresponding to an axial cross-section of the rolling bearing elements to be received in said space for conditioning, means for causing high speed relative rectilinear movement of said plates in a direction perpendicular to the axes of the rolling bearing elements to be conditioned, means for applying pressure to at least one of said plates and means for supplying abrasive material to said surfaces, at least one of said surfaces being formed with a profiled track extending in a direction substantially parallel to the direction of relative movement of the plates and adapted to receive said elements with their axes perpendicular to said direction of movement, the depth of which track is less than half of the rolling element diameter.

3,913,276

APPARATUS FOR GRINDING AGRICULTURAL DISCS

William H. Darr, Sr., Beaver Falls, Pa., assignor to Crucible Inc., Pittsburgh, Pa.

Filed Aug. 28, 1974, Ser. No. 501,308
Int. Cl.³ B24B *5/18, 29/00*
U.S. Cl. 51—108 BS **4 Claims**



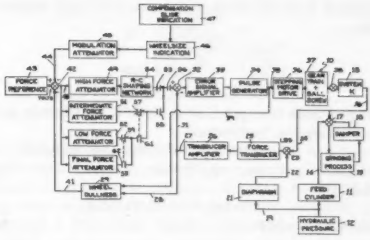
1. Apparatus for the edge grinding of agricultural discs, said apparatus comprising disc-supporting means including a rotating table having thereon at least two disc-supporting stations, means for rotating said table to selectively bring each said station and a disc supported thereon into and out of grinding position relative to grinding means for edge grinding said discs, means for axially rotating said disc and means for selectively bringing said means for axially rotating said disc into and out of contact with a disc in said grinding position, said grinding means including a grinding wheel, driving means for said grinding wheel, and means for selectively moving said grinding wheel into and out of grinding contact with said disc when said disc is positioned in grinding relation thereto.

3,913,277

GRINDING MACHINE

Robert S. Hahn, Northboro, and Richard P. Lindsay, Marlboro, both of Mass., assignors to Cincinnati Milacron-Heald Corporation, Worcester, Mass.

Continuation of Ser. No. 285,628, Sept. 1, 1972, which is a continuation of Ser. No. 94,389, Dec. 2, 1970, abandoned. This application Apr. 29, 1974, Ser. No. 465,237
Int. Cl.² B24B *49/10*
U.S. Cl. 51—165.77 **1 Claim**



1. A grinding machine for producing a surface of revolution on a workpiece, comprising:

a. a base,

b. a table carrying a wheelhead with a spindle and abrasive wheel mounted on the base,

c. means for mounting the workpiece on the base,

d. feed means to bring about relative movement between the tables and the base transversely of the spindle to bring about an instantaneous force between the wheel and the workpiece to cause a grinding action between the wheel and the workpiece,

e. a gage for measuring the instantaneous force between the wheel and the workpiece,

f. a sensing system adapted to determine the wheel size and the wheel dullness and to generate signals indicative of these physical characteristics, and

g. a feed-back control receiving a combined signal from the gage and the sensing system, and operative, when the combined signal varies from a predetermined value, to adjust the feed means.

3,913,278

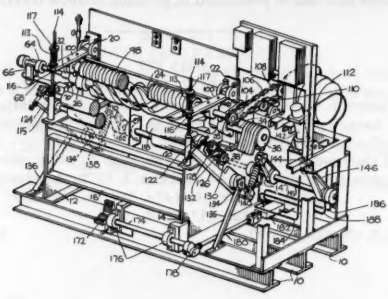
ABRASIVE CYLINDER FOR HIDE TREATING MACHINES

John N. Kokoras, 10 Martinack Ave., and William N. Kokoras, 44 Linden Road, both of Peabody, Mass. 01960

Division of Ser. No. 149,536, June 3, 1971, Pat. No. 3,813,819. This application May 10, 1974, Ser. No. 468,894
Int. Cl. B24d *5/04*
U.S. Cl. 51—206 P **3 Claims**

1. An abrasive cylinder for operating upon a sheet of material comprising an abrasive body formed with a plurality of helical ribs oppositely directed from a radial plane longitudinally bisecting the cylinder, each rib being of sufficient depth and substantially thicker at its base than at its periphery

thereby providing a relatively constant abrading effect upon the sheet material when the surface speed of the cylinder is



reduced as its diameter is decreased through repeated dressings.

3,913,279

GRINDING OR POLISHING DEVICES

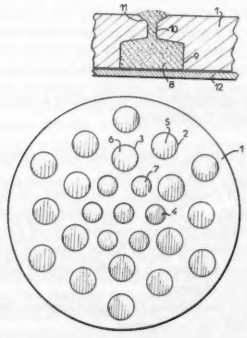
Jacques Jean Georges Gaston Brōido, 18 Chemin de Challendin, Geneva, Switzerland

Filed Oct. 10, 1973, Ser. No. 405,110

Claims priority, application France, Oct. 18, 1972, 72.36859

Int. Cl.² B24D 7/14

U.S. Cl. 51—209 **14 Claims**



1. A movable abrading device, comprising:

pluralities of first and second abrading means for cooperating in abrading a workpiece surface by effecting rapid movements of abrasive particles, carried by a fluid composition injected between said abrading means and said workpiece surface, to abrade said workpiece surface;

said first abrading means consisting of a solid material which contains at least particles of a hard metal of the group comprising cast iron and steel;

said second abrading means consisting of a solid material which contains at least particles of a metal softer than said hard metal;

said first and second abrading means having surface portions exposed to said fluid composition and all of which are flush with one another, for cooperatively defining a regular abrading surface coextensive with said first and second abrading means, being contiguous with one another in said abrading surface, and being regularly distributed over the same;

whereby the rapid movements of the abrasive particles to abrade the workpiece surface are effected in regular cycles during which abrasive particles are implanted in said soft metal in a first part of each cycle, are rolled by said hard metal in a second part of each cycle, and are vibrated between said hard and soft metals in a third part of each cycle, thus enabling rapid and regularly distributed abrasion of the workpiece surface.

3,913,280

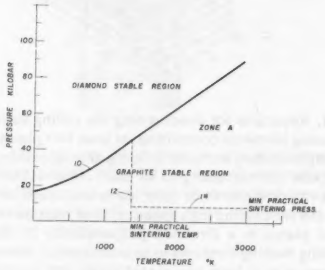
POLYCRYSTALLINE DIAMOND COMPOSITES

Howard T. Hall, Provo, Utah, assignor to Megadiamond Corporation, Provo, Utah

Continuation-in-part of Ser. No. 111,019, Jan. 29, 1971, Pat. No. 3,816,085. This application Mar. 20, 1974, Ser. No. 452,881The portion of the term of this patent subsequent to June 11, 1991, has been disclaimed.

Int. Cl.² B24D 3/02; C04B 31/16

U.S. Cl. 51—307 **8 Claims**



1. A diamond-nondiamond carbon polycrystalline composite consisting essentially of 50–99% by weight of diamond particles which are sintered to adjacent diamond particles forming diamond to diamond bonds and graphite and sintering aid in a combined amount of about 50–1% by weight interspersed in voids between the sintered diamond particles, the nondiamond carbon reverting from diamond carbon by exposing the diamond carbon to temperature and pressure conditions in which diamond is unstable.

3,913,281

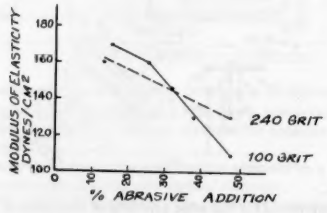
BALL GRINDING CERAMIC WHEEL CONTAINING MANGANESE DIOXIDE

Cecil M. Jones, Worcester, Mass., assignor to Norton Company, Worcester, Mass.

Filed Jan. 15, 1974, Ser. No. 433,507

Int. Cl.² B24D 3/16

U.S. Cl. 51—308 **2 Claims**



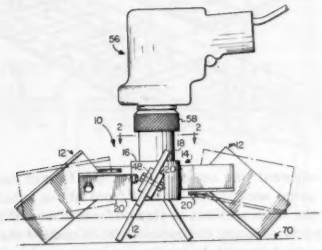
1. A hard dense ceramic wheel for the finish grinding of spheres for ball bearings, the wheel having a composition comprising a clay component in the ceramic bond in the range of 10% to 30% by weight of the dry mix from which the wheel is made, a crystalline alpha alumina filter present in said bond in an amount of at least 15% by weight of the dry mix, particles of said filler being less than about 44 microns maximum size in their longest dimension; abrasive grits in said bond

being coarser than said filler and in a size range of 80-grit size and finer based on the U.S. Standard screens; said abrasive grits being selected from the group consisting of Al_2O_3, SiC and mixtures thereof; said grits being present in a range of from 10 to 50% by weight of the dry mix; and said bond and abrasive mix including at least 5 to 9% by weight of manganese oxide, said wheel having a modulus of elasticity of from 110×10^{10} dynes/cm^2 to 180×10^{10} dynes/cm^2, and a density of from 2.8 to 3.25 grams/cm^3.

3,913,282
ABRADING DEVICE

Jack W. Whitsett, Box 1482, Coral Gables, Fla. 33134

Continuation-in-part of Ser. No. 395,971, Sept. 10, 1973, Pat. No. 3,858,367. This application Jan. 6, 1975, Ser. No. 538,578
Int. Cl.² B24B *9/02*; B23D *79/08*
U.S. Cl. 51—332 **7 Claims**



1. An abrading device adapted for use in combination with a rotating drive means, said device comprising:

at least two axially elongated abrading members, each comprising a blade portion having a first end, a second end, a top edge and an abrading edge, and having mounting apertures, each aperture located in one of said blade portions between said first end and the midpoint between said first and second ends;

mounting means, rigidly connected to and rotatable by said rotating drive means, for supporting said abrading members,

said mounting means including means for freely supporting said abrading members for pivotal movement about fixed axes, at a position offset from the axis of rotation of said mounting means,

said mounting means having an axis of rotation coaxial with the axis of rotation of said drive means,

said means for freely supporting said abrading members including rods secured to said mounting means along said axes, each of said axes being perpendicular to a plane which forms a positive subtended angle of less than 90° with a plane perpendicular to said axis of rotation,

said mounting apertures each having a diameter larger than said rods and each of said rods passing through one of said apertures,

said means for freely supporting said abrading members also supporting said abrading edges in non-coplanar planes when said drive means is not rotating, said edges forming dihedral angles of less than 180° with a plane perpendicular to said axis of rotation,

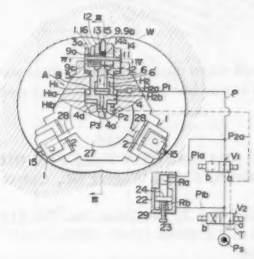
said means for freely supporting said abrading members also supporting said abrading edges at an angle to the plane perpendicular to said axis of rotation which is greater than said dihedral angles when said rotating drive means is operated so said abrading edges describe a conical surface,

said device being operative to accomplish abrading by engaging at least a portion of said abrading edges against an object as said abrading members rotate to thus cause said abrading edges to abrade said object.

3,913,283
AUTOMATIC HONING STONE EXPANSION DEVICE

Tsutomu Yoshino, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Aug. 30, 1974, Ser. No. 502,239
Claims priority, application Japan, Sept. 4, 1973, 48-99622
Int. Cl.² B24B *33/06*
U.S. Cl. 51—349 **7 Claims**



1. In a honing stone expansion device for use in a honing machine for polishing a trochoidal form surface of a workpiece which comprises at least one honing stone holder having a honing stone mounted thereon and radially outwardly disposed around a main body fixedly mounted on a rotatable honing shaft, and means for extruding said honing stone holder radially outwardly from said main body, an improvement which comprises hydraulic pressure means communicating with said honing stone holder for expansion thereof with an inner part of said honing stone holder formed into a piston reciprocatingly received in a cylinder formed in said main body and with an outer part of said holder formed into a channel shaped holding portion, a clamping member of similar shape being received in said channel shaped holding portion and carried by said holder, a honing stone extrusion member disposed in said honing stone holder with an inner portion of said extrusion member formed into a piston reciprocatingly received in a cylinder formed in said honing stone holder for automatically extruding said extrusion member by said hydraluic pressure means with an outer portion of said extrusion member adapted to support an extrusion plate on which said honing stone is mounted, regulating means communicating with said hydraulic pressure means for extruding said extrusion member a predetermined amount for automatically adjusting the height of said honing stone, and means for automatically locking and releasing said extrusion plate and honing stone to and from said clamping member, said locking means being operated by said hydraulic pressure means.

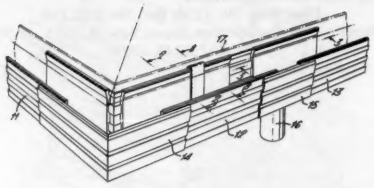
3,913,284
ROOF GUTTERING

Marshall John Hall, Ingleside, Australia, assignor to Patent Development Pty. Limited, Ingleside, Australia

Filed Oct. 15, 1973, Ser. No. 406,578
Int. Cl.² E04D *13/06*
U.S. Cl. 52—11 **12 Claims**

1. A roof gutter assembly comprising a trough member, said trough member having a front wall, a back wall and a floor joined to the lower edges of said front wall and said back wall; a tongue formed along the upper edge of said front wall; a facia plate having a recess being removably received in said recess, said tongue to thereby removably mount said facia plate to said front wall, said facia plate forming an upward extension of said front wall when mounted to said front wall; a recess formed along the lower edge of said front wall; a facia plate having a tongue, said recess receiving said tongue to

removably mount said last mentioned facia plate to said front wall, said last mentioned facia plate forming a lower extension



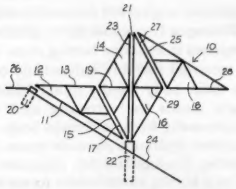
of said front wall when mounted to said front wall; and recess means formed in said back wall for receiving a soffit member.

3,913,285

BUILDING FRAME STRUCTURE FOR HILLSIDES

Robert H. Helfrich, 11128 Wagner St., Culver City, Calif. 90230

Filed Oct. 7, 1974, Ser. No. 512,511
Int. Cl. E04b 1/344; E02d 27/16
U.S. Cl. 52—64 **15 Claims**



1. A frame structure for a building and the like located on a hillside, formed of a plurality of coextensive and laterally spaced-apart assemblies of triangular truss members with lateral girders connected therebetween, each of said triangular truss members having a base chord and two side chords, each of said assemblies of triangular truss members including a first triangular truss member positioned with its base chord supported by a plurality of foundation points at least one of which is located downhill from another to locate an upper side chord in substantially horizontal position to said hillside and said other side chord of said first triangular truss being at an incline to said upper side chord and a second triangular truss member having a lower vertex supported on the lowermost foundation point and a lower side chord coextensive with and in joined connection to the inclined side chord of said first triangular truss member and the base chord of the second triangular truss being substantially perpendicular to the upper side chord of said first triangular truss member.

3,913,286

MODULAR BUILDING UNIT

Theodore A. Boutacoff, Eagle Point, Oreg., assignor to Envex Corporation, White City, Oreg.

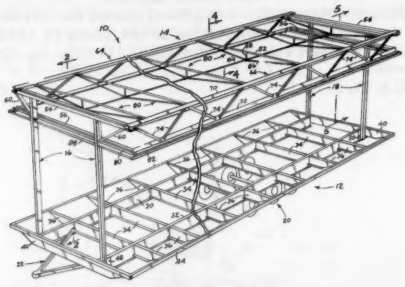
Filed Jan. 4, 1974, Ser. No. 430,637
Int. Cl.² E04H 1/12
U.S. Cl. 52—648 **4 Claims**

1. A moment resistant space frame for a modular building unit comprising

an elongate, horizontally disposed lower frame assembly,

an elongate, horizontally disposed upper frame assembly overlying and spaced above said lower frame assembly, with one end of the upper frame assembly positioned over one end of the lower frame assembly and the opposite end of the upper frame assembly positioned over the opposite end of the lower frame assembly,

said upper frame assembly being supported above said lower frame assembly solely by a pair of upright support posts adjacent one set of ends of said frame assemblies and another pair of upright support posts adjacent the opposite set of ends of said frame assemblies, said posts in each of said pairs being secured adjacent their lower set of ends to said lower frame assembly and secured adjacent their upper set of ends to said upper frame assembly in a manner to provide moment resistant connections between said upper and lower ends of the posts and said frame assemblies, and wherein said posts in said



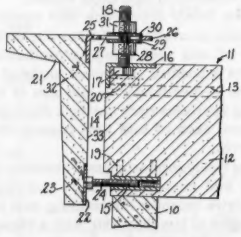
pair adjacent one set of ends of the frames assemblies have cross sections as viewed from above which differ from the cross sections as viewed from above of the posts in the pair adjacent the opposite set of ends of the frames, with a post in said pair adjacent one set of ends of the frame assemblies comprising a beam having a web and flanges projecting outwardly therefrom and said beam is disposed in said frame with the web thereof occupying a plane substantially paralleling a vertical plane occupied by the longitudinal axis of the frame and with the flanges thereof disposed substantially normal to said plane.

3,913,287

STRUCTURAL SYSTEM

Roger S. Chapman, Jr., 93 Mohawk Drive, Wallingford, Conn. 06492

Continuation-in-part of Ser. No. 793,470, Jan. 23, 1969, abandoned. This application Feb. 4, 1971, Ser. No. 113,050
Int. Cl.² E04B 7/18, 2/88
U.S. Cl. 52—94 **12 Claims**



1. In a building structure having structural members defining a building and a vertically disposed member providing an exterior covering or enclosure for said structure; first means extending generally horizontally from said vertical member adjacent the upper edge thereof and providing first surfaces, a plurality of second means attached and extending from portions of said structure each of said second means including threadably vertically adjustable members providing spaced apart supporting second surfaces, abutment means independent of said first and second mentioned means extending

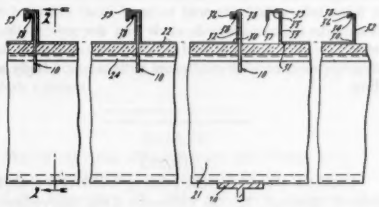
horizontally between a lower portion of said vertical member below said first-mentioned means and a portion of said structure defining points residing in a vertical plane, said second means supporting said vertically disposed member through said first means on said building structure on said second surfaces and said abutment means spacing said vertically disposed member with respect to said structure and reacting against a turning moment of said vertical member about said support surfaces, said supporting surfaces being adjustable in the vertical to support said vertically disposed member in horizontal alignment with said structure.

3,913,288

FASTENING DEVICE FOR INTERLOCKING PANELS

Dale B. Prescott, 461 Fox Hills Drive North, Bloomfield Hills, Mich. 48013

Filed Oct. 24, 1974, Ser. No. 517,474
Int. Cl.² E04D *3/362*
U.S. Cl. 52—127 **3 Claims**



1. A fastener for securing like building panels in adjacent side-by-side relationship to a support structure,

wherein each panel has opposite side edges with one side edge having a relatively shorter male flange terminating in a relatively smaller sidewise inwardly extending reverse bend overlying the one side edge, and

the other side edge having a relatively longer female flange terminating in a relatively larger sidewise outwardly extending reverse bend out-lying the other side edge, and

wherein the male flange of one panel lies within the female flange of the next adjacent panel in nested relationship, and

wherein the support structure comprises beams lying transverse to the panels having an inwardly extending rib relative to the panels;

said fastener having an L-shaped head for fitting over said male flange, a leg portion leading from said head past said male flange and to the rib on the beam of the support structure, and a hook end for engaging the rib on the beam directly securing said panels at their male flanges to the support structure;

the female flange of the adjacent panel nesting over said L-shaped head of said fastener as well as over the male flange of the adjacent panel,

upon crimping the nested male and female flanges with said fastener head nested between them in interlocked condition, said fastener secures both said panels to the support structure.

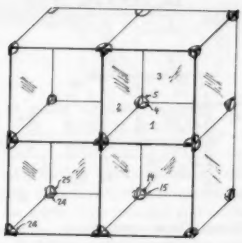
3,913,289

CONNECTING DEVICE FOR PANEL-SHAPED MEMBERS

Bodo Recker, Peitschenweg 6, D 5190 Stolberg, Germany

Filed May 11, 1973, Ser. No. 359,518
Claims priority, application Germany, June 27, 1972, 7223898[U]
Int. Cl.³ F16B *5/06*
U.S. Cl. 52—285 **13 Claims**

1. A connecting unit for connecting together a plurality of plate-like members, said connecting device comprising a first one-piece member having a plurality of pairs of walls with the walls of each pair being in parallel relation and spaced apart a distance corresponding substantially to the thickness of plate-like members to be connected together to form a recess and the pairs of walls being at a preselected angle to one another, a selectively usable second member formed separate and apart from said first member, each said recess opening through opposite ends of said first member and said second



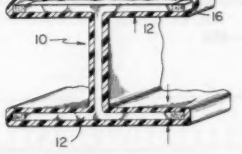
member being in the form of a closing plate closing said recesses at one end thereof, said closing plate having a pair of spaced walls extending between each adjacent pairs of walls of said first member and each pair of closing plate walls defining a notch for receiving a corner of a closing panel-shaped member, and securing means releaseably securing said second member to said first member with said second member engaging said member first walls at said recesses one end and closing the same.

3,913,290

FIRE INSULATION EDGE REINFORCEMENTS FOR STRUCTURAL MEMBERS

Rudolph W. Billing, Littleton, and George K. Castle, Chelmsford, both of Mass., assignors to Avco Corporation, Cincinnati, Ohio

Continuation-in-part of Ser. No. 454,077, March 25, 1974, abandoned. This application June 13, 1974, Ser. No. 478,844
Int. Cl.³ E04F *13/06*; E04C *3/293*
U.S. Cl. 52—347 **6 Claims**



1. In combination with a structural member having flange portions terminating in an edge susceptible of receiving heat from three directions, a fire insulation structure comprising:

insulation means secured in an abutting relationship to said edge, the insulation means having thickness equal to the thickness of said edge and a depth greater than the thickness of said edge; and

a mesh means around the periphery of said insulation means, said mesh means having leg portions extending beyond the insulation means, said leg portions being engageable with the flange portions of the structural member to secure said insulation means in an abutting relationship with the edge of the flange wherein a fireproof coating is applied over the entire structural member and mesh means thereby substantially reducing the

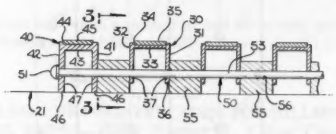
amount of heat flow directed to the end and edges of the flange during fire conditions.

3,913,291

FLEXIBLE METAL DUCKBOARD FLOORING

Frederick M. Dulien, 11611 S. Alameda St., Los Angeles, Calif. 90059, and Lawrence S. Wohl, 4501 Yarkwood Ave., Woodland Hills, Calif. 91364

Filed Dec. 19, 1973, Ser. No. 426,358
Int. Cl.² A47L *23/24*
U.S. Cl. 52—403 **12 Claims**



1. A duckboard floor comprising:

a. a plurality of substantially parallel slats defining a supporting surface and a lower surface;

b. a plurality of support members for spacing said slats one from the other said members extending beneath said lower surface of said slats so as to support said plurality of slats from a primary surface;

c. a plurality of rods being disposed through said slats and said support members for securing the relative position of said slats and said support members such that said slats are supported by said members above said primary surface;

d. adjustable tensioning means for adjustably tensioning said rods such that said slats and support members are held in said relative position under tension;

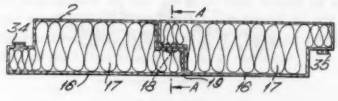
wherein said slats are flexibly supported between said support members and wherein the flexibility of said slats may be adjusted.

3,913,292

SELF-SUSTAINING WALL AND CEILING PANEL FORMING A HOLLOW BODY AND FILLED WITH A FIREPROOF MATERIAL

Anton Braekkan, Oslo, Norway, assignor to A/S Akers Mek. Verksted, Norway

Continuation of Ser. No. 315,326, Dec. 15, 1972, abandoned. This application July 15, 1974, Ser. No. 489,044
Int. Cl.² E04B *2/40*; E04C *1/07*
U.S. Cl. 52—406 **6 Claims**



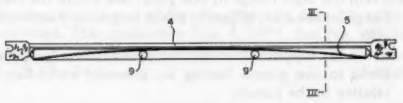
1. A fire-proof constructional panel of a modular type for the construction of a compartment, wherein the panel is constructed from fireproof materials and is capable of being interconnected with other similar panels for providing substantially gas-tight sealed joints and capable of being easily detachable, the arrangement of the panel comprising in combination: fireproof metallic sheets forming a parallelepipedic hollow body filled with fireproof material; opposite parallel side edges of said body each being of a stepped configuration such that said panel has a T-shaped cross-section and each side edge comprising a first side surface connected to one of the top and bottom spaced parallel surfaces of said body, a second side surface connected to the other of said top and bottom surfaces and a third surface parallel to said top and bottom surfaces and interconnected with said first and second surfaces and extending inwardly from said first surface a distance of approximately one-half the spacing between said top and bottom surfaces, said first and second surfaces being parallel and extending towards one another a distance of approximately one-half the spacing between said top and bottom surfaces; hook-shaped locking elements provided on each of said third surfaces and extending outwardly thereof; the stepped edges of said body being capable of meeting the corresponding stepped edges of another said body, with such body being arranged so that its T-shaped cross-section is inverted with respect to said body, said stepped edges of said bodies forming a labyrinth seal and said locking element interengaging with corresponding locking elements on said other body under the force of gravity thereby effecting a substantially self-sustaining fireproof wall; opposite longitudinal end surfaces of said body, each having correspondingly parallel grooves therein, said grooves forming outwardly extending flanges capable of being selectively brought into engagement with guide rails mounted on a floor of a compartment to be constructed for providing a labyrinth seal at the floor; and the other end of the body being adapted to be selectively guided in a labyrinth sealing channel secured in a ceiling of a compartment to be constructed, such that the side walls of the channel provide support and engagement surfaces for said body and provides a labyrinth seal between said body and the ceiling.

3,913,293

GRILLE OR DIVIDER FOR A WINDOW SASH

Robert F. Bischoff, Jr., 30 Fairmont Ave., Morristown, N.J. 07960

Filed Mar. 29, 1973, Ser. No. 346,145
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² E06B *9/01*
U.S. Cl. 52—456 **1 Claim**



1. A divider grille for use in a window sash of the type including a large-area glazing pane to simulate subdivision of said pane into the appearance of a plurality of smaller panes, said divider grille comprising:

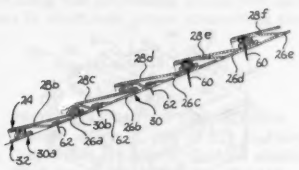
1. at least one elongated grille element, having an element face adapted to engage the glazing pane when said divider grille is installed in said window sash;
2. said grille element housing an elongated reinforcing member extending within the grille element interior for substantially the length of the grille element;
3. said reinforcing member being of tempered resilient material preset by said tempering into an arced configuration along its length;
4. the protuberant portion of the arc configuration being positioned in said grille element nearer to said element face thereof than are the ends of the arc configuration;
5. whereby upon installation of said divider grille in said window sash, said reinforcing member resiliently urges said grille element face into contact with said glazing pane and resiliently opposes floatation of said divider grille away from said glazing pane.

3,913,294

ASPHALT COMPOSITION HIP AND RIDGE COVER

Bennie Freiborg, 4536 Indiana Ave., La Canada, Calif. 91011

Filed Feb. 15, 1974, Ser. No. 442,792
Int. Cl.² E04D *1/30*
U.S. Cl. 52—518 19 Claims



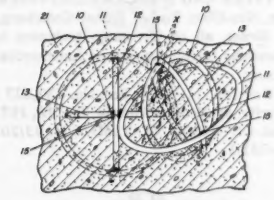
19. A ridge cover comprising a generally elongate sheet of asphalt composition roofing material having first and second ends and a longitudinal axis, said first end being folded under to form a closed lip adjacent said first end of said ridge cover, said sheet being folded about at least first and second axes adjacent said second end to form multiple layers of roofing material in the folded region, said ridge cover having a bottom surface adjacent to said lip coated in at least one region with an asphalt cement.

3,913,295

METHOD AND MEANS FOR REINFORCING CEMENTATORY MATTER

Edward W. Thompson, W. 3614 Rockwell, Spokane, Wash. 99205

Filed July 3, 1969, Ser. No. 838,865
Int. Cl.² E04C *5/00*; E04B *1/00*
U.S. Cl. 52—659 2 Claims



1. A reinforced concrete structure comprising:

a plurality of relatively small skeletonized three dimensional bodies of material, having desired tensil and shear strength, constructed with more than two substantially planar elements, whose planes angularly intersect, each planar element having unitary peripheries defining medial voids, the said bodies interfitting with each other and defining intercommunicating voids between and about the bodies, said voids containing hardened cementatory matter which is reinforced by said bodies; wherein, the angularly intersecting substantially planar elements are substantially circular and three such elements are disposed in three different planes at substantially right angles to each other.

3,913,296

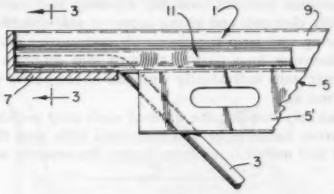
END SUPPORT SHOE FOR COMPOSITE JOIST

Ernest O. Butts, Ottawa, Canada, assignor to Hambro Structural Systems Ltd., Ottawa, Canada

Filed Oct. 1, 1973, Ser. No. 402,207
Int. Cl.² E04C *3/04*
U.S. Cl. 52—694 9 Claims

1. In a steel joist for use in a composite steel and concrete floor structure having a horizontal extending top chord, with a vertical extending cross-section a bottom chord vertically spaced from the top chord, a zig-zag bar web having its apices welded to the top and bottom chords; the improvement comprising:

an end support shoe including an angle upon which an end of the bar web and said top chord are welded, and



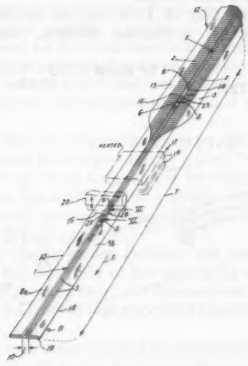
means acting as a torsion bar between said shoe and top chord including a torsion bar directly welded to the bar web and to the angle from one end and extending therefrom along said top chord in an elongated S-shaped curve disposed in a horizontal plane with the other end opposite to the angle being welded to the top chord for strengthening said joist by said torsion bar limiting the horizontal flexing or twisting of said web and top chord.

3,913,297

SLIDE-FASTENER PACKAGE AND PROCESS FOR MAKING SAME

Karlheinz Deneke, Kettwig, and Hans Paas, Neviges, both of Germany, assignors to Opti-Holding AG, Glarus, Switzerland

Filed Mar. 26, 1973, Ser. No. 345,215
Claims priority, application Germany, Aug. 18, 1972, 22408259; Aug. 25, 1972, 22417669
Int. Cl. B65b *11/08*
U.S. Cl. 53—32 7 Claims



1. A process for individually packaging slide-fastener units each essentially consisting of two juxtaposed coupling elements on respective carriers and a slider engaging said coupling elements for alternately interlinking and separating same, comprising the steps of:

forming an integral series of fastener units by interlinking two complementary fastener chains secured to respective carrier bands, dividing said chains into coupling elements by forming longitudinally spaced windows therein between said carrier bands, and introducing a respective slide into each of said windows for engagement with adjoining pairs of coupling elements;

advancing said series of fastener units along a predetermined path together with a strip of flexible sheet material having marginal portions projecting laterally beyond said carrier bands;

progressively folding said projecting marginal portions about said carrier bands with maintenance of a longitudinal gap between confronting edges of the folded-over marginal portions, said gap exposing said pairs of coupling elements and giving access to said sliders;

severing said strip together with said carrier bands along transverse lines passing through said windows into fastener units individually wrapped in respective strip sections; and

detachably bonding the ends of each strip section to said carrier bands along said transverse lines, over the widths of said marginal portions, during the severing step.

3,913,298
METHOD OF PACKAGING

Joseph A. Cogliano, Baltimore, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 267,720, June 29, 1972, abandoned. This application Oct. 24, 1973, Ser. No. 409,351

Int. Cl.² B65B *33/00*

U.S. Cl. 53—36 **9 Claims**

1. A process for packaging an article which comprises embedding the article to be packaged in discrete particles of non-porous foamed polystyrene, said particles being coated with a latex selected from the group consisting of natural and synthetic rubbers and thereafter at ambient conditions coagulating said latex by contact with a gaseous coagulant selected from the group consisting of carbon dioxide, SO_2, SO_3, NO and NO_2 thus forming a lightweight, unified, rigid packaging material encasing said article.

3,913,299
APPARATUS FOR ENVELOPING AND TREATING SUBSTANCES

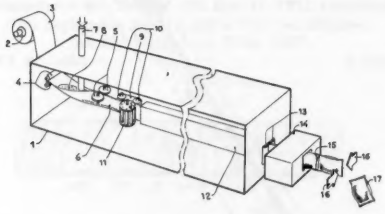
Lennart Arvid Stenstrom, Huddinge, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed May 13, 1974, Ser. No. 469,609

Claims priority, application Sweden, May 21, 1973, 73071052

Int. Cl.² B65B *55/02*

U.S. Cl. 53—127 **3 Claims**



1. Apparatus for heat treatment and packing of a liquid, which comprises means forming a heat treatment zone, means for continuously supplying a tube of flexible material for passage through said zone, a device for continuously filling the tube with liquid, said zone including a portion adapted to give a thin ribbon-like form to the tube passing therethrough, means for passing the liquid-filled tube through the heat treatment zone at a predetermined velocity while moving the liquid through said zone and within the tube at a velocity greater than said tube velocity, thereby providing rapid and uniform heat treatment of the liquid, and means acting on the liquid-filled tube passing from the heat treatment zone for closing and sealing the tube at spaced intervals.

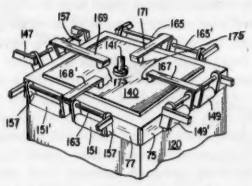
3,913,300
ROLL FORMING CARTON LIDDING MACHINE

James A. Benzing, Hamilton, Ohio, assignor to Champion International Corporation, Hamilton, Ohio

Filed Jan. 4, 1974, Ser. No. 430,696

Int. Cl.² B65B *7/28*

U.S. Cl. 53—287 **16 Claims**



1. In a lid forming device for forming and attaching flat lid blanks to a pre-filled carton bottom having vertical and parallel end walls and wherein said lid is provided with marginal side and end flaps and corner tabs attached to the end flaps, the improvement wherein said folding means includes a presser plate for pressing the lid down, a lifting means for raising the filled carton against the under surface of said lid to move said presser plate upwardly; roll means actuated by said presser plate to fold said side and end flaps inwardly toward the carton walls and means acting on said tab means to fold same downwardly before said roll means contacts and while said roll means is folding said flaps whereby said corner tabs are tucked under said side flaps when the flaps are pressed against the vertical walls of the pre-filled carton bottom.

3,913,301
APPARATUS FOR THREADING CLOSURES ONTO BOTTLES AND SIMILAR CONTAINERS

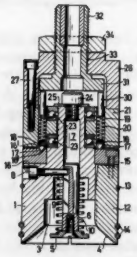
Dieter Keller, Neu-Ulm; Rudolf Kuhn, Gunzburg, and Willi Dotzauer, Strass, all of Germany, assignors to Furstlich Hohenzollernsche Huttenverwaltung Laucherthal, Laucherthal, Germany

Filed Jan. 11, 1974, Ser. No. 432,627

Claims priority, application Austria, Jan. 18, 1973, 402/73

Int. Cl.² B65B *7/28;* **F16D** *7/04, 43/20*

U.S. Cl. 53—331.5 **13 Claims**



1. In an apparatus for threading closures onto bottles and similar containers, a combination comprising a rotary shaft; rotary closure-engaging means for entrainingly engaging a closure to be threaded onto a container; and coupling means for coupling said engaging means with said shaft, comprising a first coupling member connected for joint rotation with said shaft, a second coupling member connected for joint rotation with said engaging means, a plurality of torque transmitting elements arranged on one of said members around the axis of rotation of said rotary shaft, and a ring surface on the other of said members, said torque transmitting elements yieldably

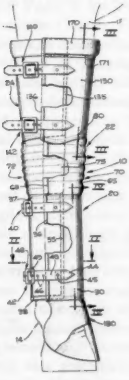
engaging said ring surface and said ring surface surrounding said axis of rotation, said torque transmitting elements being movable in directions the inclination of which relative to said axis of rotation is common for all torque transmitting elements and said ring surface gradually rising slightly from a first level to a second level and descending steeply at only one part of its circumference from said second level to said first level, the direction of rising and descending of said ring surface being the direction in which said torque transmitting elements are movable.

3,913,302

PROTECTIVE BOOT FOR HORSES

Allen Dale Centers, deceased, late of 222 E. Foothill Blvd., Arcadia, Calif. 91006 (by Alta A. Centers, administratrix)

Filed Aug. 5, 1974, Ser. No. 494,416
Int. Cl.² B68B *3/08*
U.S. Cl. 54—65 **1 Claim**



1. A boot adapted to encircle the leg of a horse for protecting the cannon, the leg joint immediately above the cannon, and the portion of the leg immediately above said leg joint, comprising:

a lower casing for surrounding the cannon, including an outer sleeve and an inner lining of resilient material,

an articulated hinge attached to the upper edge of the lower casing for surrounding the leg joint at the upper end of the cannon,

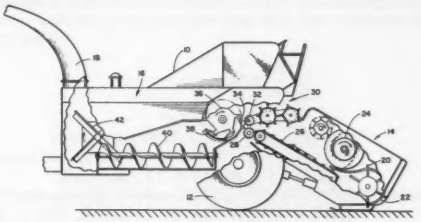
and an upper casing attached to the upper edge of said hinge and extending thereabove for surrounding the portion of the leg extending upwardly from said joint, including an outer sleeve having an inner lining of resilient material, said hinge including outer and inner generally rectangular flexible sheets attached to one another along their edge portions and having compressible material sandwiched therebetween, and wherein the hinge sheets are attached to one another additionally along a plurality of spaced parallel lines of attachment extending partially circumferentially of the hinge and forming a plurality of arcuately extending sections, and the hinge sheets are attached to one another additionally along a line of attachment transverse to the circumferential lines of attachment and disposed generally midway between end edges of the sheets, dividing said hinge into a front portion and a rear portion.

3,913,303

FEED ROLL CONSTRUCTION FOR FORAGE HARVESTER

Nathan L. Blake, Coldwater, and Gerald F. Richards, Celina, both of Ohio, assignors to Avco Corporation, Coldwater, Ohio

Filed Mar. 4, 1974, Ser. No. 447,919
Int. Cl.² A01D *45/02*
U.S. Cl. 56—14.1 **2 Claims**



1. A forage harvester feed roll assembly comprising, in combination:

a spaced pair of fixed main frames,

a spaced pair of support frames individually located outboard of said main frames,

front, intermediate and rear feed rolls respectively having front, intermediate and rear shafts journaled in said support frames,

said main frames having stop formations to define lower-limit positions for said front and intermediate feed rolls,

a first torsion bar journaled in the main frames at points above the support frames,

a second torsion bar bridging and rigidly secured between the support frames at points above and between said front and intermediate feed rolls, and

duplicate means, one on each side, for urging the ends of the feed rolls toward the lower-limit positions while permitting independent upward displacement of the ends of the rolls with resultant restoring forces exerted by said torsion bars, each of said duplicate means comprising:

a first linkage between the rear of said associated support frame and one end of said first torsion bar, so arranged that relative upward movement of said rear turns said end,

a second linkage comprising an arm on and rigid with said end of said first torsion bar,

a first spring means between the associated main frame and said arm for transmitting spring force through said first linkage to urge the rear of said associated support frame downwardly,

a second spring means between the associated main frame and a surface of the associated support frame located between front and intermediate feed rolls for urging the front of said associated support frame downwardly, and

slide-and-race means formed to confine limited displacements of said rear of said associated support frame to the vertical.

3,913,304

TREE TRIMMER

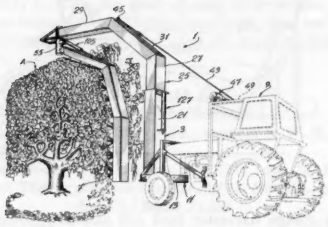
Paul Jodoin, St-Jean Baptiste, Comte de Rouville, Quebec, Canada

Filed Apr. 29, 1974, Ser. No. 465,336
Int. Cl.² A01D *55/18*
U.S. Cl. 56—235 **8 Claims**

1. A tree trimmer for trimming a tree from the top center down to the lower lateral edge thereof, said trimmer comprising:

a. a support arm, stationary in operation of said trimmer, having a generally upright section and a bent section extending away from said upright section so that its outer end, in operation of said trimmer, reaches out to said top center;

b. a rotary cutter arm having an upper end which, in operation of said trimmer, stands at said top center; said cutter arm having a shape, from said upper end, corresponding to the outer linear contour to be given said tree from said top center down to said lower lateral edge;



c. means mounting said upper end of said cutter arm to said outer end of said support arm for rotation of said cutter arm about a vertical axis extending transversely of said cutter arm;

d. means holding said cutter arm, with respect to said support arm, in a position wherein it follows said linear contour, and

e. cutting means along said cutter arm to chip limbs of said tree that project past said linear contour.

3,913,305

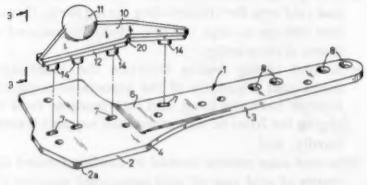
BALL AND SLIDE PLATE ASSEMBLY FOR A MOWER SICKLE BAR

Arne O. Andresen, Racine, Wis., assignor to Walker Forge, Inc., Racine, Wis.

Filed Mar. 22, 1974, Ser. No. 453,718

Int. Cl.² A01D *55/02*

U.S. Cl. 56—303 **11 Claims**



11. As an article of manufacture: a one-piece stamped steel slide plate for use in a ball and slide plate assembly for mower sickle bar, said slide plate having a plurality of tapered holes extending therethrough between opposite surfaces of said plate for securing said plate to another portion of said assembly, said holes diverging from one of said surfaces, said slide plate further having a plurality of apertures therethrough for securing said plate to said sickle bar, and said plate having an attaching portion which is offset upwardly from said one surface of said steel plate.

3,913,306

HARVESTER ATTACHMENT HAVING A RESILIENTLY SUPPORTED TILTABLE SLIDE RAIL

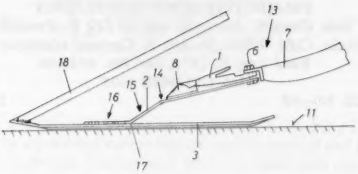
Gustav Schumacher, II, and Gunter Schumacher, both of Haus Nr. 51, 5231 Eichelhardt, Germany

Continuation-in-part of Ser. No. 387,279, Aug. 10, 1973, abandoned. This application Jan. 7, 1975, Ser. No. 539,253

Claims priority, application Germany, Aug. 24, 1972, 2241699

Int. Cl.² A01D *65/02*

U.S. Cl. 56—313 **10 Claims**



1. A ground skid for mowers of harvesters, comprising an elongated slide rail adapted to engage and slide along the ground, said slide rail having an elongated substantially straight intermediate portion and opposed front and rear end regions which are both inclined upwardly from said elongated straight intermediate portion, while respectively extending forwardly and rearwardly therefrom, and an elongated springy support leg having a rear upper portion carrying a means for attaching said springy support leg to the mower, said springy support leg having a lower front elongated straight portion fixed to and extending longitudinally along said intermediate straight portion of said rail at an upper surface of said intermediate straight portion, and said support leg having next to said front straight lower portion thereof an upwardly and rearwardly inclined straight portion intersecting said front lower portion thereof at a predetermined angle and defining therewith a pivot axis extending transversely across said rail and support leg for interconnecting said support leg and rail for mutual turning movement at said axis one with respect to the other in response to engagement of said slide rail with ground irregularities so that said springy support leg and rail are capable of yieldably turning one with respect to the other at said pivot axis, said lower straight front portion of said springy support leg and said pivot axis at the rear end thereof being situated forwardly of a central region of said intermediate portion of said slide rail which is situated midway between said front and rear end regions of said slide rail.

3,913,307

VACUUM CONDUIT PICK-UP DEVICE

Daniel E. Cardinal, Jr., 1352 Estate Lane, Lake Forest, Ill. 60045

Filed July 19, 1973, Ser. No. 380,900

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² A01D *46/24*

U.S. Cl. 56—328 R **7 Claims**

1. A device for picking up fruit or other materials comprising, in combination:

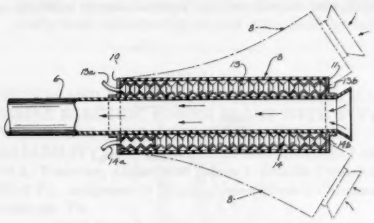
a. a frame,

b. an elongated flexible conduit mounted on said frame and with said flexible conduit having an outer end mouth for engaging the said materials,

c. means for vacuumizing said conduit so that the said materials will flow through said conduit from said mouth,

d. a plurality of tubular flexible longitudinally expandable members disposed along and generally parallel to the outer end portion of said flexible conduit,

e. and means to expand said flexible expandable members to thereby support the wall of said flexible conduit and



hold it in a relatively rigid position at a desired angle of disposition.

3,913,308

METHOD AND APPARATUS FOR THE MANUFACTURE OF FANCY YARNS

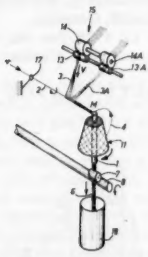
Paul Lemaire, Wambrechies (Nord), France, assignor to Filature de Saint Andre, Saint Andre-Nord, France

Continuation of Ser. No. 277,751, Aug. 3, 1972, abandoned. This application Feb. 26, 1974, Ser. No. 445,891

Claims priority, application France, Aug. 31, 1971, 71.31453

Int. Cl.[2] D02G *3/36, 3/38, 3/34*

U.S. Cl. 57—18 **6 Claims**



1. A device for the manufacture of a fancy yarn comprising a foundation component, a covering component and a binding component, a hollow rotary spindle with the hollow portion extending concentrically to the axis of rotation of the spindle and having an inlet end at one end and an outlet end at the other end, means for directing the foundation component along a path of travel extending transversely of the axis of said spindle and toward the inlet end of the hollow portion of said spindle, delivering means for feeding the covering component into the path of travel of said foundation component at a position spaced between and from said means for directing said foundation component and the inlet end of said spindle, said covering component being fed by said delivering means in a direction extending transversely to the path of travel of said foundation component, a bobbin with said binding component wound thereon mounted concentrically with the hollow portion of said spindle for rotation therewith for feeding said binding component to the path of travel of said foundation component and covering component before said foundation component and covering component enter the inlet end of said spindle so that the rotation of said spindle helically winds said binding component about the combined said foundation and covering components and effects a false twist in said foundation component between said directing means and the inlet end of said spindle and the rotation of said foundation component due to the false twisting thereof winds said covering component on said foundation component, take-up rolls for the combined foundation, covering and binding components located downstream of the outlet end of the hollow portion of said spindle, said take-up rolls arranged to draw the combined said components through said spindle at a speed lower than the speed at which said covering component is delivered by said delivering means and with the false twist in said foundation component being lost as it passes through the hollow portion of said spindle and unwinding said covering component where it is not tightly bound by said binding component with the fancy yarn emerging from the outlet end of said spindle.

3,913,309

FIBROUS COMPOSITION OF MATTER

Nereo Chiarotto, Via Bussola 7, Varese, Italy

Filed Mar. 11, 1971, Ser. No. 123,401

Claims priority, application Italy, Mar. 17, 1970, 22050/70; July 3, 1970, 26982/70; Nov. 12, 1970, 31683/70

Int. Cl. D02g *3/36, 3/44*

U.S. Cl. 57—144 **8 Claims**

1. A composite yarn which exhibits fire resistant properties due to thermal decomposition, said yarn comprising a glass-fiber core, a carbonizable coating for said core consisting of a blend of a natural animal fiber with a synthetic fiber, said coating exhibiting thermal decomposition, upon being subjected to high temperatures, and forming a substantially carbonaceous residue rendering the yarn fire resistant.

3,913,310

METHOD OF SPINNING TEXTILE FIBERS

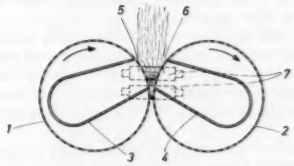
Ernst Fehrer, Auf der Gugl 28, Linz, Austria

Filed Oct. 25, 1974, Ser. No. 517,934

Claims priority, application Austria, Nov. 28, 1973, 9997/73

Int. Cl.[2] D01H *1/12*

U.S. Cl. 57—156 **4 Claims**



1. A method of spinning textile fibers, which comprises
feeding fibers to an elongated throat defined by two confronting perforate surfaces which move in generally opposite directions past said throat,
producing a vacuum behind each of said surfaces adjacent to said throat, whereby said fibers are twisted together at said throat to form a thread,
drawing off said thread from said throat in a direction which is substantially parallel to the longitudinal direction of said throat, and
holding said thread against rotation as it is thus drawn off.

3,913,311
BATTERY POWERED TIMEPIECES

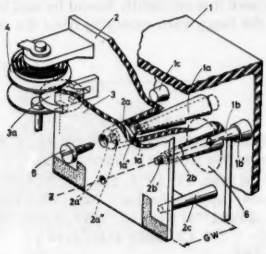
Robert Wolber, Lauterbach, and Josef King, Schramberg-Sulgen, both of Germany, assignors to Gebruder Junghans GmbH, Germany

Filed May 23, 1974, Ser. No. 472,811

Claims priority, application Germany, June 1, 1973, 2327819

Int. Cl. G04c *3/00*; **G04b** *29/02, 13/02*

U.S. Cl. 58—23 R **12 Claims**



1. In a timepiece having battery powered clock movement, frame means for mounting said clock movement, housing cap means, said frame means including spaced front and rear plate means, and connector means for coupling said plate means and said housing cap means, the improvement wherein said connector means comprises:

a primary pillar assembly including a pair of coaxial, hollow, primary pillar means, one of said primary pillar means being operably disposed and engaged between said front plate means and said housing cap means to separate said front plate means from said housing cap, and the other of said primary pillar means being operably disposed and engaged between said front plate means and said rear plate means to separate said front plate means from said rear plate means;

fastener means defining the sole means of securing together said housing cap, said front plate means, and said rear plate means against separation in the direction of the axes of said primary pillar means, said fastener means comprising a single fastener disposed along the coaxial axes of said pair of hollow, primary pillar means to secure said rear plate means, said front plate means, and said housing cap means together;

an auxiliary pillar assembly comprising a pair of coaxial auxiliary pillar means;

one of said auxiliary pillar means being operably connected between said front plate means and said housing cap means independently of a separate fastener, to prevent relative movement therebetween in a direction transverse to the axis of said one auxiliary pillar means, and

the other of said auxiliary pillar means being operably connected between said front plate means and said rear plate means to prevent relative movement therebetween in a direction transverse to the axis of said other auxiliary pillar means.

3,913,312
SOLID STATE ELECTRONIC TIMEPIECE

Hitomi Numabe, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

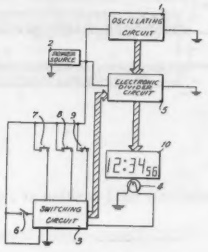
Filed Dec. 26, 1973, Ser. No. 427,941

Claims priority, application Japan, Dec. 25, 1972, 48-359

Int. Cl.² G04B *19/30, 27/00*

U.S. Cl. 58—50 R **4 Claims**

1. An electronic timepiece having a liquid crystal digital display and comprising oscillator means for generating a relatively high frequency time standard signal; electronic divider means coupled to said oscillator means and adapted to supply low frequency signals to said digital display that are representative of present time in response to said high frequency time standard signal, a light source proximate to the display for illuminating same; safety switch means coupled to said electronic divider circuit and said light source, at least one manually operated correction switch selectively coupled through said safety means to said electronic divider means at a first mode of said safety switch means to effect time correction and being further coupled through said safety switch means to said light source at a second mode of said safety switch means to energize same.



3,913,313
HAND MOUNTING APPARATUS FOR A CLOCK

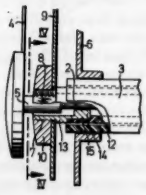
Friedrich Assmus, Schramberg, Germany, assignor to Gebruder Junghans GmbH, Germany

Filed Feb. 11, 1975, Ser. No. 549,102

Claims priority, application Germany, Feb. 28, 1974, 7406972[U]

Int. Cl.² G04B *13/02*

U.S. Cl. 58—138 **5 Claims**



1. A clock hand mounting apparatus comprising:

a hollow shaft;

one end of said hollow shaft including a serrated section suitable for being driven;

the other end of said hollow shaft including screw threads and planar surfaces interrupting said screw threads;

a first clock hand having a recess corresponding to the shape of said other shaft end and being mounted thereon so as to be non-rotative relative to said hollow shaft;

another shaft extending through said hollow shaft for supporting a second clock hand;

a threaded nut being threadedly attached to said screw threads in force-fit securement to secure said first hand on said hollow shaft;

said force-fit securement of said nut imposing forces on said other shaft end tending to deform said other shaft end;

said hollow shaft comprising at least first and second interconnected sections formed of materials of different strengths;

said first shaft section defines said one shaft end and is formed of plastic material; and

said second shaft section defines said other shaft end and is formed of a material less susceptible to deformation that the plastic material of said first section, to effectively resist deformation of said other shaft by said nut.

3,913,314

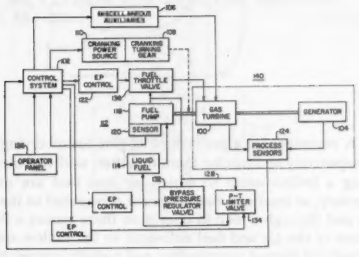
SYSTEM AND METHOD FOR OPERATING A GAS TURBINE ELECTRIC POWER PLANT WITH BYPASS FLOW FUELING OPERATION TO PROVIDE IMPROVED RELIABILITY AND EXTENDED APPARATUS LIFE

Robert A. Yannone, Aldan, and James J. Shields, Philadelphia, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 9, 1972, Ser. No. 261,192

Int. Cl.² F02C *7/26*

U.S. Cl. 60—39.14 **34 Claims**



1. A gas turbine electric power plant comprising a gas turbine having compressor, combustion and turbine elements, a generator coupled to said gas turbine for drive power, a fuel system for supplying fuel to said gas turbine combustion element, said fuel system having at least a liquid fuel subsystem provided with a source of liquid fuel, a pump for pumping liquid fuel from said source to said combustion element, a throttle valve for regulating the flow of liquid fuel to said combustion element, a main flow path connecting said pump to said throttle valve and said throttle valve to said combustion element, a bypass flow path from said main flow path for controlling pump discharge pressure, means for mechanically determining a bypass flow of liquid fuel through said bypass flow path, and a control system including means for operating said liquid fuel subsystem to supply liquid fuel through said main flow path to said combustion element for turbine startup and plant loading operations, said fuel system operating means including means for regulating the pump discharge pressure, said mechanical flow determining means operating substantially independently of said control system to limit the pump discharge pressure during at least a part of the turbine operating time after initiation of ignition.

3,913,315

SULFUR RECOVERY FROM FLUIDIZED BED WHICH HEATS GAS IN A CLOSED CIRCUIT GAS TURBINE

Geoffrey Frederick Skinner, Berkshire, England, assignor to Foster Wheeler Energy Corporation, Livingston, N.J.

Continuation of Ser. No. 253,741, May 16, 1972. This application Jan. 10, 1974, Ser. No. 432,278

Claims priority, application United Kingdom, May 17, 1971, 15348/71

Int. Cl. F02c *7/02, 1/00*

U.S. Cl. 60—39.18 R **15 Claims**

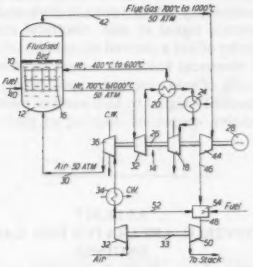
1. A power plant comprising:

a fluidised bed burner;

means for firing said fluidised bed burner to operate at a given pressure;

tubes positioned so that they are immersed within said bed burner during operation of said burner;

a gas turbine, said gas turbine having a compressor of a capacity and operating pressure for compressing gas to be heated to a pressure within one atmosphere greater than



said given pressure and an expansion turbine for expanding heated compressed gas and extracting energy therefrom;

a power generator driven by said gas turbine;

a conduit for passing compressed gas from said compressor to said tubes for heating said compressed gas; and

a conduit for passing said heated compressed gas from said tubes to said expansion turbine.

3,913,316

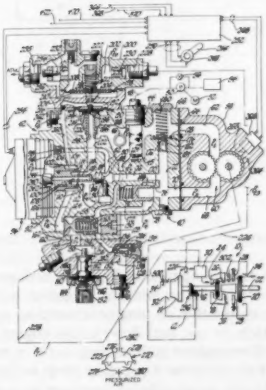
TURBINE ENGINE CONTROL SYSTEM

Raymond P. Canale, Warren, and Wesley J. Ross, Sterling Heights, Mich., assignors to Colt Industries Operating Corporation, New York, N.Y.

Division of Ser. No. 203,313, Nov. 30, 1971, Pat. No. 3,777,482. This application Jan. 11, 1974, Ser. No. 432,749

Int. Cl.² F02C *9/02, 3/10*

U.S. Cl. 60—39.25 **1 Claim**



1. A control system for a turbine engine having a gasifier section, a power output turbine and a variably openable nozzle assembly generally interposed between said gasifier section and said power turbine effective to at least at times variably restrict the flow to said power turbine of gases generated in said gasifier section, comprising fluid operating actuating

means operatively connected to said variable nozzle assembly and effective to actuate said nozzle assembly to varying degrees of opening, servo valve means situated generally between a source of pressurized actuating fluid and said actuating means for controlling the flow of said actuating fluid to said actuating means, electrical control means including an electrical control circuit effective to vary the position of said servo valve means, additional means responsive to indicia operation of said turbine engine and the degree of opening of said nozzle assembly for in turn creating and applying a an electrical control signal to said electrical control means in order to thereby affect a desired movement of said servo valve means, and electrical feedback means responsive to the degree of opening of said variable nozzle means for operatively creating a feedback signal to said control means indicative of the then existing degree of opening of said variable nozzle means.

3,913,317
FUEL CONTROL APPARATUS FOR GAS TURBINE ENGINES

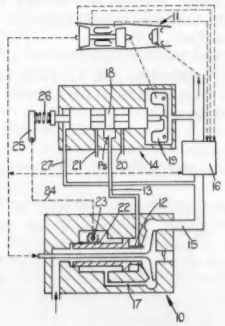
Geoffrey Arthur Lewis, Solihull, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Dec. 6, 1973, Ser. No. 422,161

Claims priority, application United Kingdom, Jan. 26, 1973, 3983/73

Int. Cl. F02c 9/08

U.S. Cl. 60—39.28 R **12 Claims**



1. A fuel control apparatus for a gas turbine engine, comprising a pump having an inlet and an outlet, a variable metering device responsive to engine operating conditions and through which, in use, fuel flows to the engine, a servo pressure control arrangement including a valve movable in response to a decrease in a pressure drop across the variable metering device to provide an increase in a servo pressure signal, a throttle for said pump between the inlet and outlet thereof, said throttle being movable in response to an increase in said servo pressure signal to increase the delivery pressure of said pump, and means responsive to the position of said pump throttle and operatively connected to said valve so that movement of said pump throttle in a direction to increase said delivery pressure urges said valve to decrease said servo pressure signal.

3,913,318
GAS TURBINE ENGINE COMBUSTION EQUIPMENT

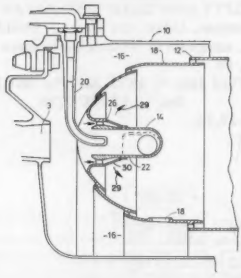
Roger Geoffrey Fox, and Vernon Frederick Cox, both of Bristol, England, assignors to Rolls-Royce (1971) Limited, London, England

Filed Aug. 8, 1973, Ser. No. 386,633

Claims priority, application United Kingdom, Aug. 10, 1972, 37305/72

Int. Cl. F02c 7/18, 7/22

U.S. Cl. 60—39.66 **2 Claims**



1. A vaporizer for a gas turbine engine for receiving air and fuel separately and mixing them together, said vaporizer comprising a hollow stem to which air and fuel are delivered separately, at least one radial branch connected to the hollow stem and through which in operation there passes a flow of a mixture of the air and fuel delivered to the hollow stem, and a cylindrical shroud surrounding and radially spaced from the hollow stem to define an annular space for receiving a supply of air but not fuel, the cylindrical shroud having means defining holes provided in the wall thereof through which in operation air passes out of said annular space in a direction substantially radially of the stem to mix with the mixture of air and fuel discharged from the radial branch of the hollow stem immediately downstream of the discharge from said radial branch.

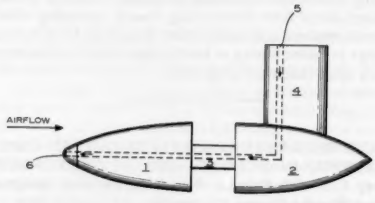
3,913,319
LOW DRAG FLAMEHOLDER

Patrick H. Hall, China Lake, Calif., assignor to The Unites States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 2, 1972, Ser. No. 222,853

Int. Cl.² F02C 7/22

U.S. Cl. 60—39.72 R **1 Claim**



1. A flameholder for use in a combustor comprising:

first and second streamline paraboloidal shaped bodies each having a vertex and an end surface portion;

cylindrical spacer having its diameter substantially smaller than the diameter of said end portions and positioned between said first and second bodies with the flat surface ends of said spacer in contact with the end surface of the

first and second bodies to form a substantial gap therebetween;

a streamline strut attached to one of said bodies for holding said flameholder in spaced relationship to the wall of a combuster with the longitudinal axis of said flameholder parallel to air flow through the combustor; and

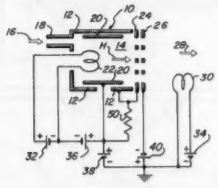
a fuel conduit extending through said strut and through the axis of at least one of said bodies to terminate at the vertex of said body on the upstream side of the air flow; whereby flow of fuel through the conduit exits into the air stream at the vertex forming a combustible mixture that is carried over the surface of the upstream body to the gap area to replenish the mixture of gases within the gap establishing a stable recirculation zone at a piloting flame.

3,913,320

ELECTRON-BOMBARDMENT ION SOURCES

Paul D. Reader, and Harold R. Kaufman, both of Fort Collins, Colo., assignors to Ion Tech, Inc., Fort Collins, Colo.

Filed Nov. 13, 1974, Ser. No. 523,483
Int. Cl.² F02K 9/00; F03H 1/00; H05H 5/02
U.S. Cl. 60—202 **14 Claims**



1. An electron-bombardment ion source comprising:

means defining a chamber for containing an ionizable propellant;

means for introducing said propellant within said chamber;

an anode disposed within said chamber;

an electron-emissive cathode disposed within said chamber;

means for impressing a potential between said anode and cathode to effect electron emission at a sufficient velocity to ionize said propellant;

an apertured screen disposed in the vicinity of one end of said chamber;

an apertured grid spaced from said screen in a direction away from said chamber with the apertures in said grid being alined relative to the apertures in said screen so that said screen shields said grid from ionic bombardment;

means for impressing a potential between said grid and both said anode and cathode for accelerating ions out of said chamber through said screen and said grid;

and passive means for maintaining a surface, within said chamber and exclusive of said anode and said cathode, at a potential at least approaching the potential on said cathode during steady-state production of ions within said chamber and at a potential at least approaching the potential on said anode during the initiation of ion production prior to the existence in said chamber of a discharge plasma.

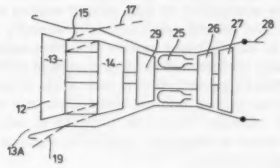
3,913,321

GAS TURBINE ENGINE POWER PLANT

Leonard Stanley Snell, Bristol, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Nov. 12, 1973, Ser. No. 414,990
Claims priority, application United Kingdom, Nov. 17, 1972, 53160/72
Int. Cl.² F02K 3/04
U.S. Cl. 60—226 R **3 Claims**

1. A gas turbine power plant comprising in flow series a first air compressor means, a second air compressor means, a combustor, and turbine means for driving the compressor means, an annular arrangement of ducts comprising first ducts movable between respective first positions for conveying air from the first to the second compressor means and respective second positions for conveying air from the first compressor means to ambient atmosphere, and second ducts movable between respective first positions for conveying air from the first to the second compressor means and respective second positions for conveying air from ambient atmosphere to the second means, characterized in that the first and second ducts



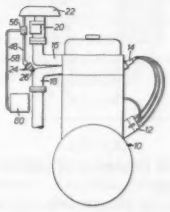
are arranged in a symmetrical annular array with the second ducts interdigitated between the first ducts and wherein each duct comprises a wall member defining the outward boundary of the duct in the radial direction of said power plant and two sides each lying in the said radial direction, and wherein each side of each first duct lies closely adjacent a side of a second duct and means are provided forming hinge connections at the upstream end of the wall member of each first duct and at the downstream end of the wall member of each second duct for facilitating the movement of said ducts between the first and second positions.

3,913,322

INTERNAL COMBUSTION ENGINES

Charles Edward Over, Betchworth, England, and Milford Melvin Scott, Las Vegas, Nev., assignors to Kinematics Limited, Betchworth, England

Filed Aug. 29, 1973, Ser. No. 392,444
Int. Cl.² F01N 3/10
U.S. Cl. 60—278 **2 Claims**



1. An internal combustion engine having cylinders, a combustion air intake and an exhaust system;

a valve comprising a housing having means defining a first opening and a second opening;

first passage means connecting said first opening to said combustion air intake;

second passge means connecting said second opening to said exhaust system at a position in said exhaust system where changes in exhaust gas pressure occur during running of said engine; and

a valve element within said housing movable in response to a pressure drop between said first opening and said second opening to a first end condition affording free flow of a gaseous medium from said first opening to said second opening, and movable in response to a pressure drop between said second opening and said first opening to a second end condition affording a restricted flow of a

gaseous medium from said second opening to said first opening,

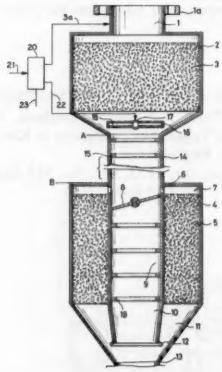
said housing having a first seating for said valve element in said first end condition and a second seating for said valve element in said second end condition;

said valve element comprising a disc movable between said seatings and having at least one gas flow aperture therethrough in an area thereof which is unobstructed by either of said seatings when said disc is in either of said end conditions, and at least one other gas flow aperture therethrough in an area thereof which is unobstructed by said first seating when said disc is in said first end condition but is obstructed by said second seating when said disc is in said second end condition; whereby when the pressure in said exhaust system is subatmospheric said valve admits air into said exhaust system at said position, said position being such that at least some of said air will be drawn back from said exhaust system into said cylinders, and whereby when the pressure in said exhaust system is super-atmospheric said valve element is in said second end condition.

3,913,323
DEVICE FOR TREATMENT OF EXHAUST GASES FROM AN INTERNAL COMBUSTION ENGINE

Paul August, C/Capellades 1, Barcelona 6, Spain

Filed Mar. 22, 1973, Ser. No. 343,719
Int. Cl.² F01N *3/14, 3/16*
U.S. Cl. 60—288 **11 Claims**



1. A device for the treatment of internal combustion exhaust gases comprising:

a first chamber having an upstream end and a downstream end and containing catalytic material for the reduction of nitrous oxide through which all of the exhaust gases flow; a main flow channel member having an upstream end and a downstream end;

a second catalyst containing chamber surrounding said main flow channel member having a plurality of ports communicating therewith and a downstream outlet remote from said ports;

a connection piece in the form of a pipe having one end connected to the downstream end of said first chamber and the other end connected to the upstream end of said channel member;

a plurality of mixing devices mounted on the inside wall of the connection piece pipe for admixing gases passing through the pipe;

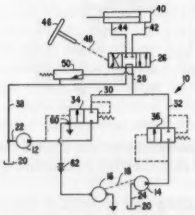
first means for supplying air to the exhaust gases near the upstream end of the connection piece pipe including at least one pipe extending transversely to said connection piece pipe for a distance at least as great as the diameter of the connection piece pipe, ports in the downstream side of the at least one pipe, and means for supplying air to the at least one pipe; and

a butterfly type control valve in said main flow channel member with the plurality of ports in the main flow channel member disposed between the control valve and the channel member upstream end for distributing the flow of exhaust gases between the main flow channel member and the second catalyst containing chamber in percentages in accordance with particular control valve positions.

3,913,324
FLOW-SENSING SWITCH FOR BACKUP STEERING SYSTEM

Wayne Russel Miller, Dubuque, and Robert James Lucke, Jr., Bellevue, both of Iowa, assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 465,836, May 1, 1974, Pat. No. 3,890,995.
This application Mar. 10, 1975, Ser. No. 556,733
Int. Cl.² F15B *20/00*
U.S. Cl. 60—405 **5 Claims**



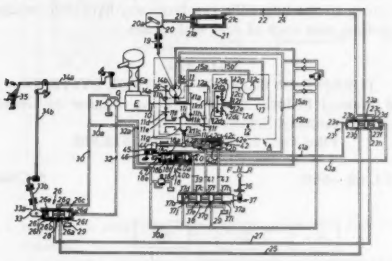
1. In a vehicle having a main power steering system including a main pump fluid connected to a fluid-operated steering motor by means including a steering valve, an auxiliary pump fluid connected to the steering motor by means including the steering valve, an electrically responsive drive means being connected to and energizable for driving the auxiliary pump, and electrical circuit means connected to said drive means and including fluid condition responsive switch means connected to the output of said main pump and being operative for connecting a source of electrical energy to said drive means in response to the fluid at the output of the main pump being inadequate for operating the steering motor, the improvement comprising: said fluid condition responsive switch means including a flow-sensing valve including a valve body defining a valve bore; an inlet and an outlet port connected to the bore at axially spaced locations and respectively to the output of the main pump and to the steering valve; said electrically circuit means including an electrical conductive means extending through the valve body and including a valve seat located in the bore between the inlet and outlet; electrical insulating means surrounding the electrically conductive means for fixing the latter and insulating it from the valve body; a valve element axially shiftably mounted in the bore and having a seating surface located for engagement with said valve seat; axially yieldable means normally biasing said valve element to a closed position wherein the seating surface thereof engages said valve seat; and said yieldable means being responsive to a predetermined pressure at said inlet port to yield axially so as to allow the valve element to shift to an open position wherein the inlet and outlet ports are in fluid communication.

3,913,325

OUTPUT SPLIT TYPE HYDROSTATIC TRANSMISSION

Takayuki Miyao, and Toshimitsu Sakai, both of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha and Aisin Seiki Kabushiki Kaisha, Japan

Filed Aug. 30, 1974, Ser. No. 501,979
Claims priority, application Japan, Sept. 5, 1973, 48-99890
Int. Cl.² F16H 39/46
U.S. Cl. 60—431 5 Claims



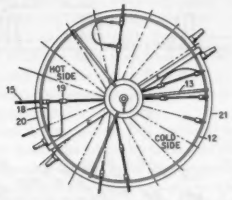
1. In a hydrostatic transmission comprising
an input means;
an output means;
a hydraulically controlled speed differential means drivingly connected with said input means for transmitting the rotation torque of said input means to said output means and including a first hydraulic positive-displacement pumpmotor functionable as a reaction element therefor; a second hydraulic positive-displacement pump-motor of the variable type drivingly connected with said input means for controlling said first pump-motor in response to the displacement ratio thereof;
means for providing hydraulic communication between said first and second pump-motors; and
a drive power train selector means assembled with said speed differential means for selectively completing the forward and reverse drive power trains inbetween said input means and said output means;
the improvement comprising
a fluid actuator connected to a fluid pump driven by said input means;
a connecting means for operatively connecting said actuator to the swash plate of said second pump-motor to continuously vary the pump angle of said second pump-motor;
a first responsive means interposed between said actuator and said fluid pump for shifting the fluid pressure applied to said actuator from said fluid pump in response to the shifting operation of said drive power train selector means to preliminarily set the initial condition of said actuator so as to determine the initial pump angle of said second pump-motor; and
a second responsive means interposed between said first responsive means and said fluid pump for controlling the fluid pressure applied to said actuator from said fluid pump in accordance with the driving condition of said input means to control the displacement ratio of said second pumpmotor.

3,913,326

ENERGY CONVERSION SYSTEM

Ridgway M. Banks, Orinda, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 11, 1974, Ser. No. 459,991
Int. Cl.² F01B 29/00
U.S. Cl. 60—527 9 Claims



1. An apparatus for converting heat energy to rotary mechanical work comprising:
a. a rotor adapted to rotate about a fixed axis, said rotor defining, distally of said fixed axis, at least one pivot and being adapted to carry, upon so rotating, said pivot in a circular path about said fixed axis,
b. a stationary pivot disposed proximate the principal plane of rotation of said rotor and eccentrically of said fixed axis,
c. at least one thermally responsive element composed of a thermal memory material that changes from a deformed configuration to a heat-treated configuration when subjected to a temperature above a predetermined critical temperature after being initially deformed from the heat-treated configuration to the deformed configuration at a temperature below said predetermined critical temperature, said thermally responsive element being prestressed in the flexure mode and being disposed such that the outer end thereof is operatively coupled to said pivot and the inner end thereof is operatively coupled to said stationary pivot whereby alternate heating and cooling of said thermally responsive element to temperatures above and below, respectively, said predetermined critical temperature produces a linear force differential between said pivot and said stationary pivot and a torque about the fixed axis of said rotor, and
d. means operatively coupling the outer end and the inner end of said thermally responsive element for synchronous rotation.

3,913,327

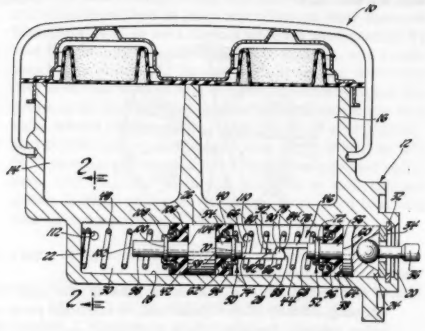
FLOW SENSITIVE VALVE MECHANISM

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 478,686, June 12, 1974, abandoned, which is a division of Ser. No. 391,216, Aug. 24, 1973, abandoned. This application Oct. 21, 1974, Ser. No. 516,672
Int. Cl.² B60T 11/22
U.S. Cl. 60—585 4 Claims

4. In a master cylinder assembly having a housing with a fluid pressurization chamber formed therein and having side walls of effective length different from the chamber end walls, a fluid reservoir containing a fluid supply for said chamber, port means continuously communicating with said chamber and adapted to be connected to a fluid circuit to be pressurized upon actuation of said master cylinder assembly and to be unpressurized upon release of said master cylinder assembly, said port means having a compensation valve chamber formed therein, and a port communicating said reservoir and said valve chamber and terminating in said valve chamber with a valve seat,

the improvement comprising a flow responsive valve positioned in said valve chamber in pivotal and slidably movable engagement with said chamber side walls and having fluid flow-impinging surfaces thereon acted upon by fluid flow through said port means to pivotally and slidably move said valve to close said valve member against said valve seat when that fluid flow is from said pressurization chamber and to open said valve member from said valve



seat when that fluid flow is toward said pressurization chamber, said valve and said valve seat being spherical sections to provide self-centering, said valve having a greater specific gravity than the fluid and acting under the influence of gravity to open said valve relative to said valve seat when there is no fluid flow in said port means and the fluid pressure in said valve chamber is no greater than the fluid pressure in said reservoir.

3,913,328

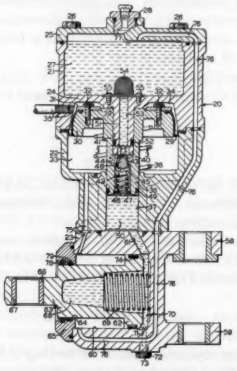
OIL LEAKAGE RECYCLER

Ronald J. Shaffer, Pittsburgh, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed July 10, 1974, Ser. No. 487,127

Int. Cl. F15b *7/00*

U.S. Cl. 60—592 **11 Claims**



1. In a pneumatically controlled hydraulically actuated brake apparatus comprising a plurality of casing sections certain of which are provided with bores, a pair of tandem arranged abutments one of which is movable in opposite directions in one of said bores responsively to the application and release of pneumatic pressure to one of two chambers formed on the respective opposite sides of the other of said abutments by the cooperative relationship of said other abutment and a pair of said casing sections, a hydraulic reservoir from which a hydraulic medium may be supplied to said one bore, a third abutment movable in another of said bores responsively to the hydraulic pressure established in one of two chambers formed on the respective opposite sides thereof by movement of said one abutment in one direction in said one bore, and seal means carried by each of said one and said third abutment to respectively inhibit flow of hydraulic medium from said one bore to the other one of said two chambers and from said one of said two chambers to the other chamber on the other side of said abutment, wherein the improvement comprises:

a. first conduit means connecting said first other chamber and said second other chamber, and

b. second conduit means connecting said second other chamber and the hydraulic reservoir,

c. said first and second conduits cooperating to effect the return to the hdyraulic reservoir any hydraulic medium leaking past each of said seal means.

3,913,329

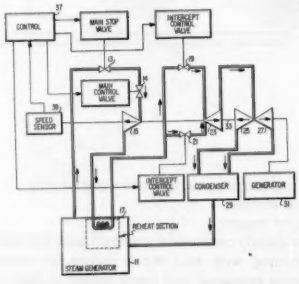
TURBINE OVERSPEED CONTROL SYSTEM

David Manuel Priluck, Saugus, Mass., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 4, 1974, Ser. No. 512,808

Int. Cl. F01k *13/02*

U.S. Cl. 60—660 **5 Claims**



1. In an overspeed control system for steam turbines of the type wherein steam flow to the turbine is reduced by a valve to decrease speed to a reference speed after sudden undesired increases above this reference speed, the improvement comprising:

a. a circuit for developing a command signal for controlling the position of the valve in response to a difference between the reference speed and the actual speed of the turbine;

b. said circuit including means for developing a command signal which initially increases at a rapid rate causing rapid closing motion of the valve during that portion of valve movement having little effect on steam flow and later increases at a less rapid rate causing less rapid closing motion of the valve during that portion of valve movement having substantial effect on steam flow, whereby said circuit compensates for a nonlinear relationship between valve movement and change in the steam flow.

3,913,330

VAPOR GENERATOR HEAT RECOVERY SYSTEM

Carl Frederick Horlitz, Jr., Bloomfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 17, 1974, Ser. No. 479,712

Int. Cl.² F01K *7/34*

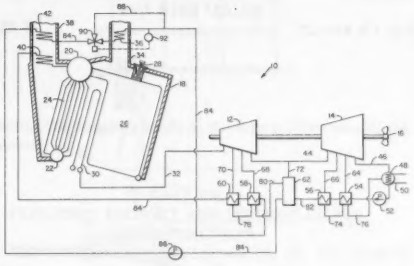
U.S. Cl. 60—678 **7 Claims**

1. A power plant system including, in combination:

a. turbine means;

b. a vapor generator having a flow circuit operatively connected for supplying motive fluid to said turbine means, said vapor generator having:

i. a furnace,
ii. fuel burning means operatively disposed in said furnace, and
iii. an exhaust gas outlet from said furnace;
c. an economizer having plural sections in heat transfer relation with combustion gases flowing through said exhaust gas outlet;
d. means for supplying feedwater to said vapor generator;
e. preheater means for preheating said feedwater by extraction fluid from said turbine means;



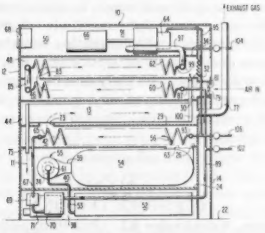
f. means for supplying combustion air to said fuel burning means;
g. a tubular air heater for preheating said combustion air; and
h. a feedwater train including means for passing feedwater seriatim through one of said economizer sections, said air heater, said feedwater preheater, another of said economizer sections and said vapor generator flow circuit.

3,913,331

UNITARY AUXILIARY ELECTRIC POWER, STEAM SUPPLY AND HEATING PLANT FOR BUILDING CONSTRUCTION

Phillip J. Conwell, R.R. No. 1, Box 10, Mount Orab, Ohio 45154

Filed Dec. 11, 1974, Ser. No. 531,609
Int. Cl.² F01K 9/00
U.S. Cl. 60—692 **5 Claims**



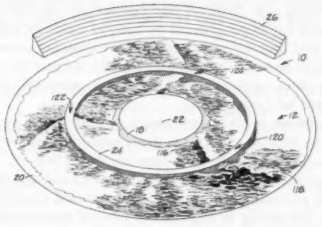
1. A compact unitary, transportable, auxiliary steam turbine driven electric generator power and heating plant comprising:
a generally closed rectangular enclosure including opposed vertical end walls and opposed vertical sidewalls and a top wall spanning the upper ends of said sidewalls and endwalls,
a plurality of vertically spaced, horizontal partitions within said enclosure forming at least first, second, third, fourth and fifth separate compartments in ascending order,
at least some of said partitions being formed of heat insulative material,
a fuel air mixture combustor carried within said first compartment,
a boiler heat exchanger coil extending transversely within said second compartment,
a plurality of horizontally spaced, vertical conductive walls within said third compartment,
manifolds at either end of said conductive walls and forming therewith a combustion air preheater heat exchanger,
a first condenser heater heat exchange coil extending transversely within said fourth chamber,
a steam turbine driven electric generator within said fifth chamber,
first conduit means fluid coupling said boiler heat exchange coil, said steam turbine and said first condenser coil and forming a closed loop path therebetween,
first duct means within said partition separating said first and second chambers to effect flow of exhaust gas from the combustor over the boiler heat exchange coil and through said second chamber,
second duct means within the partition separating the second and third chambers to direct exhaust gas after passage over the boiler heat exchange coil into the third chamber,
an exhaust pipe fluid connected to said third chamber at the end of said chamber opposite that carrying said second duct means,
an air inlet opening within an end wall of said enclosure at said fourth chamber introducing fresh air therein for passage over said condenser coil,
third duct means extending through the partition separating said third and fourth chambers for directing heated fresh air into said third chamber for counterflow to and sealed from the exhaust gas for further preheating the combustor intake air, and
fourth duct means within said third chamber at the end opposite that carrying said exhaust gas discharge pipe for receiving the preheated fresh air and conducting said preheated fresh air to said first chamber for intake by said combustor.

3,913,332

CONTINUOUS WAVE SURFING FACILITY

Arnold H. Forsman, 347 Ilo Lane, Danville, Calif. 94526

Filed Aug. 30, 1973, Ser. No. 393,130
Int. Cl.² E02B 3/00; E04H 3/18
U.S. Cl. 61—1 R **5 Claims**



1. A surfing apparatus comprising a wave generating means for generating waves suitable for surfing, said wave generating means including a generator unit having blade means mounted thereon, and power means for motivating said generator unit and thereby said blade means, and further including depression means defining an annular depression containing a body of water defining a water level and housing a generally horizontal bottom portion and a pair of side portions, said blade means being within said body of water at least partly below said water level, and guide means for guiding said generating means and said blade means mounted thereon in a generally circular path above said bottom portion and between said side portions of said depression means so as to product waves which translate to said side portions, said guide means including a generally circular tunnel structure for housing said gen-

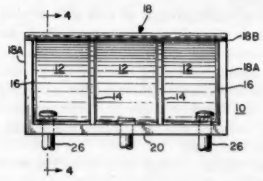
erator unit defining a top deck portion and open side portions, and rails guiding and supporting said generator unit said depression means also having two side portions for wave attenuation, and wherein said tunnel structure is located on said bottom portion intermediate said side portions whereby waves generated by said generating means travel outward away from said tunnel structure side portions to said depression means side portions.

3,913,333

MEANS AND APPARATUS FOR CONTROLLING FLUID CURRENTS AND SELECTIVELY PRESERVING AND MODIFYING TOPOGRAPHY SUBJECTED THERETO

Tom Watson Hubbard, Jr., 1213 Big Oak Lane, Sarasota, Fla. 33580

Filed Sept. 18, 1973, Ser. No. 398,305
Int. Cl.² E02B *3/06*
U.S. Cl. 61—4 **5 Claims**



1. Reaction means for fluid currents to selectively modify the action of such currents on the topography of a given situs and accrete alluvium entrained therein comprising:

securing means mounting said reaction means at said situs in the path of said currents;

an elongated curvilinear surface concave on a first face thereof defining an open face for said reaction means for receiving first currents and convex on the opposite face thereof for impingement by second currents opposed to said first and deflection of laterally directed currents; and at least two partitions substantially normal to said concave first surface and extending outward therefrom toward said open face;

said concave surface reacting with impinging currents to create opposing currents attenuating the energy of said incoming currents and causing accretion of alluvium suspended therein adjacent said open face; and said partitions providing structural rigidity to said curvilinear surface and acting to impede the flow of current laterally of said concave surface;

wherein said securing means includes a base on said reaction means and hold-down means selectively interconnected with said base to selectively orient said curvilinear surface and said faces thereof with reference to a given direction of fluid current;

wherein said base includes first, second and third mounting ports defined in said base and disposed in a triangular array, one of said ports being centrally located on said base adjacent said open face and said base being substantially coterminate with the length and breadth of said reaction means; and

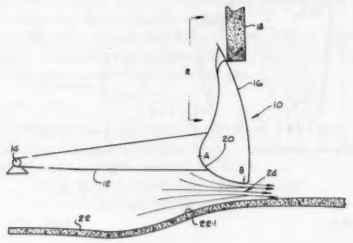
wherein said hold down means includes pivot means securing said base at said situs through said one of said ports and an array of ground anchor means positioned about said pivot means selectively engageable with remaining respective ones of said ports.

3,913,334

METHOD AND APPARATUS FOR CONTROLLING WATER FLOW FROM AN IMPOUNDED BODY OF WATER

Lawrence Alexander Turner, Middleton, and Roger Peter, Grahamstown, both of South Africa, assignors to Fluid Dynamics (Proprietory) Limited, Cape Province, South Africa

Continuation of Ser. No. 205,121, Dec. 6, 1971, abandoned.
This application Nov. 23, 1973, Ser. No. 418,239
Claims priority, application South Africa, Apr. 7, 1970, 70/2306
Int. Cl.² E02B *7/40*
U.S. Cl. 61—25 **5 Claims**



1. Barrier apparatus for controlling flow of water, in a direction from an impounded body of water upstream of said apparatus to a body of water downstream of said apparatus, so as to obtain a substantially constant water level downstream of the apparatus, said apparatus comprising:

i. a float forming a water barrier and having a smoothly curved, convex surface, said surface facing in a downward and upstream direction;

ii. a floor beneath the float surface, the floor having a curved profile and rising, in said direction of water flow, so as to converge with said float surface to define a venturi therewith;

iii. means for selectively varying the buoyancy of the float so that it can be sunk into contact with the floor or raised to an open position in which said float surface and said floor have a gap therebetween, thereby allowing water to flow in said direction; and

iv. said venturi comprising means, responsive to changes in upward force exerted on said float surface due to changes in flow velocity of said water, to displace said float downwardly and reduce the magnitude of said gap as said velocity increases with increasing upstream water level within a given range of upstream water levels, and to displace said float upwardly and increase the magnitude of said gap as said velocity decreases with decreasing upstream water level within said given range of upstream water levels.

3,913,335

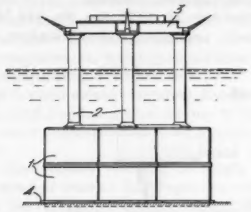
OFFSHORE TERMINAL

Sigurd Helen, Aslokkveien 82, 1362 Billingstad, Norway

Filed July 25, 1973, Ser. No. 382,505
Int. Cl. E02b *17/00;* **B65d** *11/00;* **B65g** *5/00*
U.S. Cl. 61—46.5 **8 Claims**

1. An offshore terminal comprising a plurality of prefabricated cylindrical reinforced concrete containers interconnected axially and radially, hollow pillars of steel with a substantially smaller cross-sectional area than that of the containers and upstanding from the uppermost said containers, a common platform supported on the tops of said pillars, the bottoms of the lowermost containers and the tops of said uppermost containers having polygonal portions that extend radially outwardly from the cylindrical peripheries of the containers, reinforcing steel loops protruding from the tops and bottoms of the containers, the loops of laterally adjacent

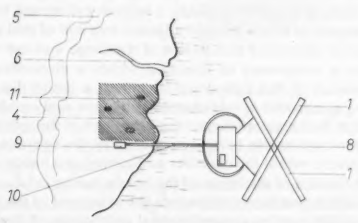
containers overlapping each other to provide coupling zones, and vertical connection members passing through and interconnecting the coupling zones at the tops and bottoms of the containers.



3,913,336
FLOATING AIRPORT AND METHOD OF ITS CONSTRUCTION

Jorge Galvez Figari, Enrique Larreta St. No. 12, Madrid, Spain

Continuation-in-part of Ser. No. 198,252, Nov. 11, 1971, abandoned. This application Mar. 11, 1974, Ser. No. 450,272
Claims priority, application Spain, June 22, 1971, 392545
Int. Cl.[2] B63B *35/00*
U.S. Cl. 61—46.5 **5 Claims**

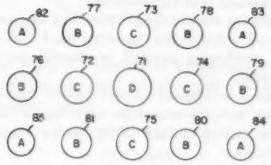


1. A floating aircraft runway constructed from a plurality of preformed modules rigidly joined to one another with their top surfaces in a common plane to define the runway, the improvement wherein said modules comprise rectangular blocks having a hollow center and having their top, bottom, and side walls integrally formed from a continuous mass of concrete reinforced with elongaged steel reinforcing members, a mass of low density cellular polymeric material filling the hollow center of said blocks to exclude water therefrom, a vertically extending undercut groove formed in each side wall of said blocks and extending the full height thereof and terminating at the top end in an opening in the top surface of said top wall, said grooves being roughened over substantially the entire surface thereof, a steel bearing plate integrally joined to and extending along the peripheral edges of said blocks, said blocks being joined in said runway in side-by-side relation with said undercut grooves in adjacent sides of joining blocks being disposed opposite one another, a reinforced concrete locking member disposed within and extending between said opposed undercut grooves, said locking members comprising an assembly of steel reinforcing rods positioned within and extending between said opposed grooves, concrete poured into the voids within and joined to the roughened surface of said opposed grooves to rigidly and permanently interlock the adjacent blocks, said reinforcing rods in said top wall being arranged in a diamond pattern with the individual rods being inclined at an acute angle with respect to the side edges of said top wall whereby a portion of the rods effectively extend between said undercut grooves on adjacent side walls of each said block, a coating of waterproof, low friction polymeric material covering at least the side walls and the bottom wall of said rectangular blocks, and a layer of resilient bituminous surfacing material covering the top walls of said blocks and forming a continuous smooth runway surface.

3,913,337
PILING

Stanley Merjan, 16 Beacon Drive, Port Washington, N.Y. 11050

Continuation-in-part of Ser. No. 235,790, March 17, 1972, Pat. No. 3,751,931, which is a continuation-in-part of Ser. Nos. 97,997, Dec. 14, 1970, abandoned, and Ser. No. 256,163, May 23, 1972. This application Nov. 6, 1972, Ser. No. 303,706
Int. Cl.[2] E02D *3/08, 5/44*
U.S. Cl. 61—50 **5 Claims**

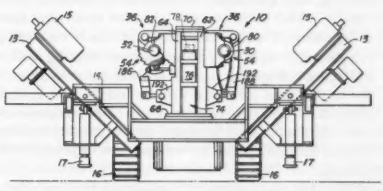


1. A group of driven piles having thereon a pile cap to distribute the load over the piles of said group, said piles having, at their bases, pre-formed tapered pile tips extending into a bearing stratum, said tips differing in displacement and comprising tips of larger and smaller displacement, a plurality of tips of smaller displacement being situated adjacent to a tip of larger displacment and being within a portion of said stratum which has previously been compacted by the nearby driving of said adjacent tip of larger displacement, said tips being tapered to increase in diameter upwards and having a greater volume: height ratio than their stems, the maximum cross sectional area of said tips being at least twice the cross-sectional areas of their stems, the taper being less than about 3 inches per foot and the axial heights of said tips being at least about 2 feet, the spacing of the axes of the tips of said group being at most about 6 feet and said larger tip having a displacement at least 5% greater than said smaller tips.

3,913,338
APPARATUS FOR POSITIONING CABLE-TYPE ROOF SUPPORTS IN A MINE ROOF

Alex J. Galis, 682 Killarney Drive, Morgantown, W. Va. 26505

Filed Nov. 22, 1974, Ser. No. 526,217
Int. Cl.[2] E21D *11/00*
U.S. Cl. 61—63 **10 Claims**



1. Apparatus for positioning cable-type roof supports in a mine roof comprising,

a mobile frame, a pair of cable spools rotatably mounted in spaced relationship at one end portion of said mobile frame for storing flexible cable,

a vertically movable support frame positioned at the other end portion of said mobile frame,

a pair of shafts rotatably secured to said support frame and arranged in spaced parallel relationship,

a pair of cable drums nonrotatably supported on said pair of shafts respectively and positioned on said support frame to receive a portion of the cable stored on each of said cable spools respectively,

drive means for rotating each of said cable drums to transfer preselected lengths of cable from said cable spools to said cable drums, said drive means operable to rotate said cable drums and feed therefrom in a direction transverse to the longitudinal axis of said mobile frame preselected lengths of cable for inserting in a pair of spaced support holes drilled in the mine roof,

said cable drums each having means for tensioning the cable having one end portion securely positioned in the support holes and the remaining portion of each of the cables reeved around said cable drums,

a cable splicing means secured to said support frame and positioned transversely between said cable drums for joining overlaping parallel positioned portions of the cables, and

a shear means positioned on said support frame adjacent to said cable splicing means for severing the spliced cables from the portion of each of the cables remaining on said cable drums.

3,913,339

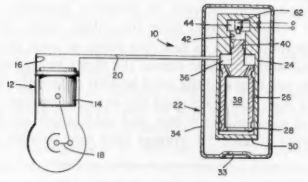
REDUCTION IN COOLDOWN TIME FOR CRYOGENIC REFRIGERATOR

Robert L. Berry, Palos Verdes Peninsula, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 4, 1974, Ser. No. 448,116

Int. Cl. F25b *9/00*

U.S. Cl. 62—6 **7 Claims**



1. An expander for a cryogenic refrigerator, said expander comprising:

an expander cylinder, a displacer type piston in said expander cylinder for dividing said expander cylinder into an expansion volume and compression volume, the area of said piston defining said expansion volume being greater than the area of said piston defining said compression volume, said expansion volume being the cold expansion volume which produces refrigeration upon gas expansion, a regenerator connected between such expansion and compression volumes, means for connecting a source of pulsating refrigerant gas to all said volumes, and means for urging said piston in a direction to first reduce said expansion volume, and increase said compression volume, and second to increase said expansion volume and reduce said compression volume, the improvement comprising:

an adjustable mechanical stop positioned to limit the stroke of said expander piston, said adjustable stop having means for controlling mechanical stop relative position between said expander cylinder and said expander piston so that said stop can be adjusted for a larger stroke of said expander piston during cooldown and to limit motion of said expander piston to a shorter stroke when said expander is operating near design temperature.

3,913,340

SUPPLY APPARATUS FOR CRYOGENIC LIQUIDS

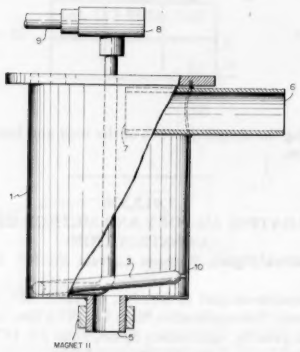
Joseph John Hurley, Paisley, Scotland, assignor to J. & P. Coats Limited, Glasgow, Scotland

Filed July 31, 1973, Ser. No. 384,309

Claims priority, application United Kingdom, Aug. 5, 1972, 36654/72

Int. Cl.² F17C *7/02*

U.S. Cl. 62—45 **3 Claims**



1. An apparatus for use in the supply of cryogenic liquid incorporating a chamber having a smooth cylindrical bore, a liquid injection nozzle located adjacent one end of said chamber and so orientated that its line of discharge into the chamber has a component of direction which is circumferential with respect to the cylindrical chamber, a liquid discharge opening at one end of said chamber adjacent said nozzle, and a vapour discharge opening at the other end of the cylindrical chamber, said nozzle being constituted by the open end of a pipe located within the chamber and curved in a helical curve so that the line of discharge of the nozzle has an axial component of direction directed towards the other end of the chamber in addition to its circumferential component of direction, said liquid discharge opening being co-axial with said chamber; said vapour discharge opening being presented by a pipe penetrating the wall of the chamber with its axis radial to the axis of the chamber, the open end of said pipe within the chamber being located close to the axis of said chamber, and an expansion valve having its discharge outlet connected to said curved pipe at the end remote from the nozzle and its inlet connectible to a liquid storage tank.

3,913,341

LOW TEMPERATURE LIQUID STORAGE TANK OF THE INTERNAL HEAT INSULATING TYPE HAVING LEAKAGE DETECTING MEANS

Kihei Katsuta, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 18, 1974, Ser. No. 480,578

Claims priority, application Japan, June 27, 1973, 48-72643

Int. Cl.² F17C *13/02*

U.S. Cl. 62—49 **1 Claim**

1. An internally thermally insulated low temperature liquid storage tank with leakage detecting means, comprising:

a tank shell;

a liquid impermeable layer lining the tank shell;

A layer of thermal insulation interposed between the liquid impermeable layer and the shell;

a secondary liquid impermeable barrier layer provided in the layer of thermal insulation, intermediate the thickness of the thermal insulation;

a layer of gas permeable sheet material located within the layer of thermal insulation next to the side of the second-

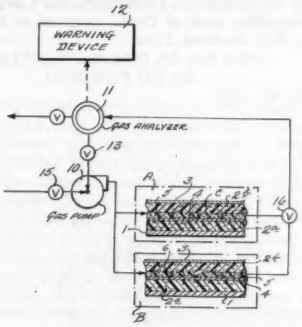
ary liquid impermeable barrier which faces inside the tank;

a plurality of gas impermeable partition members extending through the thickness of the gas permeable sheet material and dividing the gas permeable sheet material into a plurality of minor compartments;

the minor compartments being grouped into a plurality of major compartments;

a plurality of conduit means extending through the partition members, each conduit means serving to intercommunicate the minor compartments of a respective major compartment;

means for continuously pumping a supply of inert gas through selected ones of the respective major compartments via the respsective conduit means and for collecting said gas thereafter;



the collecting means including a gas analyzer for detecting the presence in the collected inert gas of leakage from the inside of the tank through the firstmentioned liquid impermeable layer into said gas permeable sheet within any major compartment;

minor compartment being provided with a plurality of rigid posts extending through the thickness thereof, these posts being spaced from one another and from the partition members within each minor compartment to prevent the flow of said inert gas therethrough from said conduit means to said collecting means; and

the pumping means including automated control means connecting the pumping means to the gas analyzer and set to automatically increase the rate of pumping of inert gas through any major compartment into which the interior of the tank is sensed to be leaking, in order to carry away the leakage and so retard the progress of such physical damage as has resulted in the leakage.

3,913,342

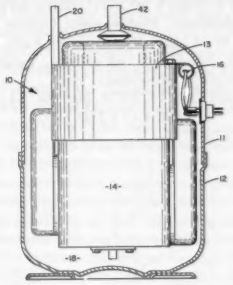
MOTOR COMPRESSOR CONTROL

Vincent T. Barry, Camillus, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed July 1, 1974, Ser. No. 484,531
Int. Cl.[2] F25B *1/00*; **G05B** *5/00*
U.S. Cl. 62—115 **9 Claims**

1. In a refrigeration unit including a motor compressor unit enclosed within a shell, said motor including a start winding, the improvement comprising:

a temperature responsive resistance element connected in series with the start winding of the motor, the resistance of said responsive element substantially increasing as a function of its temperature, the temperature thereof being increased by the flow of current therethrough, said responsive element being disposed within the shell enclosing said motor compressor unit, refrigerant gas contained within said shell passing in heat transfer relation with said responsive element, the refrigerant gas removing heat from said responsive element when the flow of current thereto is interrupted due to the deenergization of the motor whereby the responsive element is rapidly



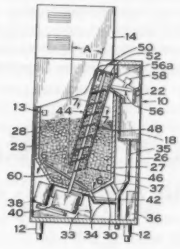
cooled to place the element in a state to permit the flow of current therethrough to said start winding when the motor is reenergized.

3,913,343

SANITARY ICE STORAGE AND DISPENSING APPARATUS AND METHOD

Michael L. Rowland, and George C. Stephens, both of 2619 Milford, Houston, Tex. 77006

Continuation-in-part of Ser. No. 152,658, June 14, 1971, abandoned. This application Oct. 29, 1973, Ser. No. 410,769
Int. Cl.[2] F25C *5/18*
U.S. Cl. 62—137 **14 Claims**



1. An ice cube vending machine comprising:

receptacle means for storing a volume of ice cubes;

a first means in communication with said receptacle means at a point spaced above the lowermost portion of said receptacle means for receiving ice cubes retained in said receptacle means and alternatively dispensing and mixing said ice cubes in said receptacle; said first means comprises a screw auger means for conveying ice cubes from a first point spaced above the lowermost portions of said receptacle means to a second point elevated above said first point, means supporting said auger means in said receptacle, and valve means attached to the elevated end of said auger means for selectively diverting ice cubes conveyed by said auger means into the upper portion of said volume of ice cubes stored in said receptacle means and out of said receptacle means;

a second means provided in said receptacle means for first vertically lifting and thereafter dropping portions of the ice cubes in said receptacle to agitate said ice cubes, and thereby eliminate bridging and fusion of said ice cubes in said receptacle;

means periodically operating said first and second means; and

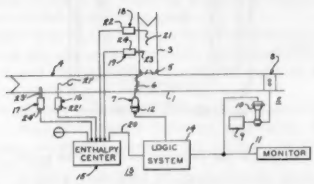
an ice manufacturing means connected to said receptacle to supply ice cubes thereto.

3,913,344

FLUID ENERGY MONITORING APPARATUS

Thomas M. Holloway, Mukwonago; George J. Janu, Brookfield; Paul W. Kuhar, Meonomonee Falls, and Richard N. Laakaniemi, Milwaukee, all of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Oct. 15, 1974, Ser. No. 514,640
Int. Cl.² F25D *17/04*
U.S. Cl. 62—176 **19 Claims**



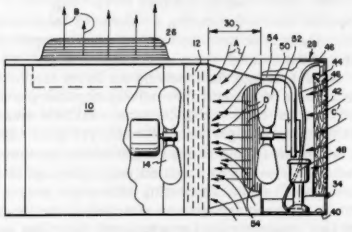
1. A heat content monitoring apparatus for generating a fluid signal in accordance with the heat content of a fluid, comprising sensing means to detect the temperature of the fluid and to generate a fluid signal having a strength level proportional to said temperature, sensing means to detect the humidity of the fluid and to generate a fluid signal having a strength level proportional to the humidity of the fluid, a resistance summing network having separate resistance branches coupled to the respective sensing means and connected to a fluid signal summing means to produce an enthalpy fluid signal related to the individual strength levels and the relative resistance in the branches of the summing network, said summing network generating an essentially constant enthalpy fluid signal over a predetermined enthalpy range of the fluid, said range being directly related to the ratio of the resistance of said resistance branches.

3,913,345

AIR CONDITIONER

William H. Goettl, 4717 N. Granite Reef Road, Scottsdale, Ariz. 85251

Filed Apr. 29, 1974, Ser. No. 465,297
Int. Cl.² F25D *39/04*
U.S. Cl. 62—183 **7 Claims**



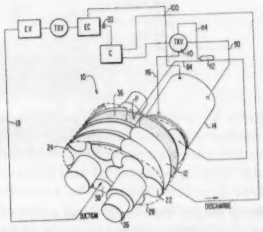
1. In a combination air conditioner, a refrigeration-type air conditioner having a refrigerant condenser, said refrigerant condenser provided with an inlet and an outlet; a refrigerant evaporator; a refrigerant vapor compressor coupled with said condenser and evaporator; said inlet of said refrigerant condenser communicating with outside ambient atmosphere; first means for forcing ambient air from atmosphere through said condenser from said refrigerant condenser inlet to said refrigerant condenser outlet and exhausting said ambient air to atmosphere; an evaporative type air cooler having an evaporative cooler pad; pump means for delivering water to said pad; second means for forcing air from ambient atmosphere through said pad and for delivering air toward said inlet of said refrigerant condenser for augmenting operation of said first means to thereby increase air flow through said refrigerant condenser; said evaporative type air cooler and said second means spaced from said refrigerant condenser a distance so as not substantially to interfere with normal ambient air flow through said refrigerant condenser as may be forced therethrough by said first means.

3,913,346

LIQUID REFRIGERANT INJECTION SYSTEM FOR HERMETIC ELECTRIC MOTOR DRIVEN HELICAL SCREW COMPRESSOR

Harold W. Moody, Jr., Farmington, and Clark B. Hamilton, Wethersfield, both of Conn., assignors to Dunham Bush, Inc., West Hartford, Conn.

Filed May 30, 1974, Ser. No. 474,629
Int. Cl.² F25B *31/02*
U.S. Cl. 62—197 **9 Claims**



1. In a refrigeration system employing an electric motor driven helical screw compressor forming a part of a closed refrigeration circuit which further includes downstream of the compressor and in order, a condenser, a thermal expansion valve, and evaporator means, wherein the electric motor includes a motor housing which hermetically seals the motor from the screw compressor and which carries a fixed stator and a rotatable rotor in concentric fashion, and the screw compressor housing is provided with a liquid refrigerant bleed port opening to a closed screw compressor thread at a pressure intermediate compressor suction and discharge, the improvement comprising:

means for bleeding liquid refrigerant from the high pressure side of the circuit, and delivering the liquid refrigerant to the bottom of the motor housing for gravity accumulation therein,

means responsive to accumulation of liquid refrigerant within said motor housing, for causing said motor rotor in response to rotation thereof, to pick up some liquid refrigerant and distribute it to that portion of said stator lying above the accumulated refrigerant to cool the same by vaporization and to thereby maintain said liquid refrigerant at a predetermined level, determined by initial contact of said rotor with said liquid refrigerant accumulating within said motor housing, and

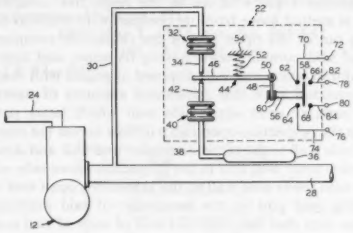
fluid passage means coupled at one end to said injection port and opening at the other end within said housing at said predetermined level;

whereby, liquid refrigerant accumulating within said motor housing is simultaneously vaporized within said housing to cool said motor and is bled to the closed thread for injection into said compressor for cooling the screw compressor closed thread content by vaporization of said liquid refrigerant therein during compression thereof.

3,913,347
SUPERHEAT CONTROL SYSTEM

Raymond F. Stevens, Cider Mill Road, Tolland, Conn. 06084

Filed Aug. 12, 1974, Ser. No. 496,336
Int. Cl.² F25B 49/00
U.S. Cl. 62—209 5 Claims



1. In a refrigeration system having a compressor, a condenser connected in fluid flow relation with the compressor by first conduit means, an expansion valve and an evaporator both being connected in fluid flow relation by second conduit means with the condenser, and with the evaporator being further connected in fluid flow relation with the compressor by third conduit means whereby refrigerant is made to flow from the compressor to the condenser, from the condenser to the expansion valve and therethrough to the evaporator, and from the evaporator back to the compressor to complete a refrigeration cycle, the improvement of a superheat control system embodied within the refrigeration system operable for sensing the superheat of the refrigerant flowing to the compressor and for performing a control function in response thereto, said superheat control system comprising:

a. first pressure sensing means operable to establish a reference pressure, said first pressure sensing means including pipe means connected at one end thereof to the third conduit means in fluid flow relation therewith at a point along the length of the third conduit means adjacent to but spaced from the compressor and so as to comprise the sole fluid flow connection with the third conduit means between the point of connection of said pipe means with the third conduit means and the point of connection of the third conduit means with the compressor, said pipe means being operable to draw thereto from the third conduit means refrigerant at the same pressure and temperature conditions as the refrigerant entering the compressor from the third conduit means, said first pressure responsive means comprising a first pressure sensitive bellows expandable by the refrigerant received therewithin so as to thereby operate to establish a reference pressure therewithin corresponding to the pressure of the refrigerant within said first pressure sensitive bellows and therefore also to the pressure of the refrigerant entering the compressor from the third conduit means, said first pressure sensitive bellows including a first member connected thereto so as to be movable therewith in accordance with the expansion and contraction of said first pressure sensitive bellows;

b. second pressure sensing means operable to establish a pressure correlated to the superheat of the refrigerant entering the compressor from the third conduit means, said second pressure sensing means including a sensing means having fluid therein supported in juxtaposed relation to the surface of the third conduit means adjacent to the point of connection of said pipe means with the third conduit means, said sensing means being operable to sense the superheat of the refrigerant flowing in the third conduit means and to establish by means of the fluid within said sensing means a pressure correlated to the sensed superheat, tube means having one end thereof connected to said sensing means for receiving fluid therefrom, and second pressure responsive means comprising a second pressure sensitive bellows having one end thereof connected to said tube means so as to receive fluid therefrom at a pressure corresponding to the pressure of the fluid within said sensing means, said second pressure sensitive bellows being expandable by the fluid received therewithin so as to thereby operate to establish a pressure therewithin correlated to the superheat of the refrigerant entering the compressor from the third conduit means as sensed by said sensing means, said second pressure sensitive bellows including a second member connected thereto so as to be movable therewith in accordance with the expansion and contraction of said second pressure sensitive bellows, said second pressure sensitive bellows being physically unconnected to said first pressure sensitive bellows so that the fluid within said second pressure sensitive bellows acts solely on said second pressure sensitive bellows and the refrigerant within said first pressure sensitive bellows acts solely on said first pressure sensitive bellows; and

c. switch means including a switch having at least one pair of contacts, at least one pair of terminals connected in electrical circuit relation with said pair of contacts and connectible in electrical circuit relation with an external electrical circuit for purposes of performing a control function, a contact member supported for movement between a first position and a second position relative to said pair of contacts, operating means mounted for movement between a first position and a second position operatively connected to said contact member for imparting movement thereto, said operating means comprising an elongated pivotably mounted lever arm having one end thereof mechanically connected to said contact member, said lever arm adjacent the other end thereof having said first member of said first pressure sensitive bellows in engagement therewith for applying a first force thereto in one direction corresponding to the reference pressure and also having said second member of said second pressure sensitive bellows in engagement therewith for applying a second force thereto in the opposite direction corresponding to the pressure correlated to the superheat of the refrigerant entering the compressor from the third conduit means wherein when said first force being applied to said lever arm by said first member of said first pressure sensitive bellows acting thereagainst exceeds said second force being applied to said lever arm by said second member of said second pressure sensitive bellows said lever arm is moved by the differential force being applied thereto to said first position thereof causing said contact member to occupy said first position thereof relative to said pair of contacts and when said first force being applied to said lever arm by said first member of said first pressure sensitive bellows is less than said second force being applied to said lever arm by said second member of said second pressure sensitive bellows said lever arm is moved by the differential force being applied thereto to said second position thereof thereby causing said contact member to occupy said second position thereof relative to said pair of contacts.

3,913,348
REFRIGERANT SYSTEM CONNECTING APPARATUS

Earl H. Magester, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed July 22, 1974, Ser. No. 490,411
Int. Cl.² F25D 19/00
U.S. Cl. 62—298 3 Claims

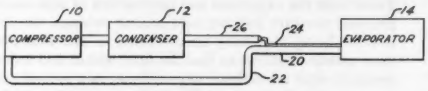
1. In a refrigeration system having a compressor, a condenser, an evaporator, a condenser outlet, an evaporator inlet, an evaporator outlet, and a compressor inlet, the improvement comprising:

first and second conduit sets, each conduit set having first and second conduits and each conduit having outer ends, said first conduit of each set having first and second portions with each portion having an inner end;

a removable plug positioned in each portion of each first conduit;

first and second sleeves each adapted to being sealably positioned over the inner ends of the first and second portions of a respective first conduit;

first and second housings, each having first and second separate chambers and being connected to the outer ends of the conduits, said first chamber of each housing being



in communication with the first conduit set and said second chamber of each housing being in communication with the second conduit set;

means for connecting the condenser outlet in fluid communication with the first chamber of the first housing;

means for connecting the evaporator inlet in fluid communication with the first chamber of the second housing;

means for connecting the evaporator outlet in fluid communication with the second chamber of the second housing; and

means for connecting the compressor inlet in fluid communication with the second chamber of the first housing.

3,913,349

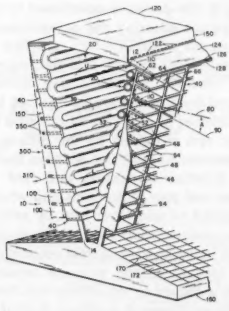
ICE MAKER WITH SWING-OUT ICE CUBE SYSTEM

Ivan L. Johnson, Omaha, Nebr., assignor to Ivan L. Johnson and Clare W. Johnson, both of Omaha, Nebr.

Filed Mar. 11, 1974, Ser. No. 450,087

Int. Cl.² F25C 5/10

U.S. Cl. 62—352 **10 Claims**



1. An ice making machine comprising: a frame, an evaporator mounted on said frame and having an inlet and an outlet, delivery means mounted on said frame, said delivery means being operably connected to said evaporator and delivering a moving cooling medium to said evaporator during a freezing cycle and for delivering moving heating medium to said evaporator during an ice harvest cycle, an ice chunk molding grid adjacent said evaporator and having a plurality of compartments disposed one above another and one along side another and each having an open outer end and an inner end wall and a plurality of other side walls which latter form a substantially closed side wall configuration, each of said side walls being disposed tranverse to and connecting the respective inner end wall and open end, said compartment open ends facing generally in the same direction, two of said side walls of each of said compartments being upper and lower side walls, each of said lower side walls being inclined with respect to the horizontal downwardly toward the open end of the respective compartment so that a piece of ice in the respective compartment which is melted loose from its compartment walls will slide by gravity out of the open end of the respective compartment, each of said upper walls being disposed at an angle with respect to the respective lower wall of the same compartment so as to permit a piece of ice in the respective compartment which is melted loose from its compartment walls to slide by gravity out of the open end of the respective compartment, each of said compartments having its upper and lower side walls and its inner end wall disposed at angles with respect to the horizontal such that substantial amounts of water from those parts of each upper side wall which latter parts are nearest the respective open end will flow across the respective upper side wall to the respective inner end wall and down said respective inner end wall to the respective lower side wall and across said lower side wall to the respective open end, means mounting said grid on the remainder of said machine in a position such that the inner end wall of each of said compartments is disposed close enough to said evaporator to be cooled and heated thereby, and means on said frame for delivering a flow of water to the open end edges of the upper side walls of upper ones of said compartments, said evaporator having lower and upper portions, and said delivery means delivering said heating medium to said evaporator during said harvest cycle specifically to the lower portion of said evaporator first so that the chunks of ice in lower compartments are first melted free of their compartment walls so that an ice chunk assembly of connected ice chunks on said grid will first swing outwardly of said grid towards vertical at its lower end and so that after said ice chunk assembly is free from said grid said ice chunk assembly will slide outwardly of said grid and then will drop downwardly while remaining in substantially upright position.

3,913,350

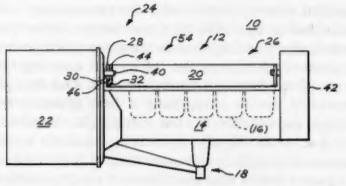
ICE MAKER INCLUDING IMPROVED RAKE ASSEMBLY

Robert J. Alvarez, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed May 31, 1974, Ser. No. 474,896

Int. Cl.³ F25C 1/04

U.S. Cl. 62—353 **5 Claims**



1. In an icemaker of a household refrigerator having a mold, mold cavities, ejector means for selectively moving ice pieces from the mold cavities, a rake selectively movable across the mold cavities for forcing ice pieces away from the mold, and power means connected to the ejector means and the rake, the improvement comprising:

said rake having first and second end portions, said first end portion having first and second openings and a slot extending therethrough, said second end portion being pivotally connected to support means, and said first opening having a drive shaft of the power means extending therethrough and being rotatably movable therein; and

a dog having a drive arm extending outwardly therefrom, said dog being releasably, fixedly attached to the drive shaft and being positionable at one of a first position at which the drive arm extends through the second opening

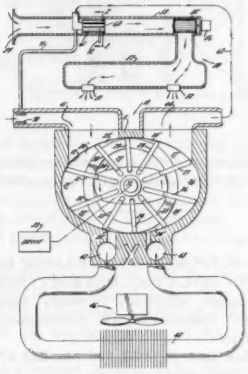
or a second position at which the drive arm extends through the slot of the first end portion of the rake.

3,913,351

AIR CONDITIONING SYSTEM HAVING REDUCED DRIVING REQUIREMENT

Thomas C. Edwards, Casselberry, Fla., assignor to The Rovac Corporation, Maitland, Fla.

Filed May 1, 1974, Ser. No. 465,841
Int. Cl.² F25D *9/00*
U.S. Cl. 62—402 **15 Claims**



1. In an air conditioning system, an air conditioning unit including a compressor and expander having rotor means driven by a common shaft, the rotor means having vanes defining enclosed compartments which become smaller and larger as the shaft rotates, the compressor and expander each having an inlet port and an outlet port, a first heat exchanger connected between the compressor outlet port and the expander inlet port, a second heat exchanger coupled to the expander outlet port, the heat exchangers being isolated from one another for communication with separate compartments, means for conducting inlet air to the compressor inlet port so that upon driving of the rotor means the air (1) is positively compressed and elevated in temperature in the compressor, (2) releases heat in the first heat exchanger, (3) is positively expanded and lowered in temperature in the expander, and (4) absorbs heat in the second heat exchanger, and a reservoir of water at the compressor inlet port adjacent the path of air flow to insure that the air which flows into the compressor is substantially saturated with water vapor, the air being sufficiently cooled in the expander as to cause condensation of the vapor with release of its heat of vaporization, resulting in an increase in the work of expansion and thereby reducing the net work required to drive the rotor, and with the condensed vapor serving to absorb heat in the second heat exchanger thereby to augment the cooling effect of the air therein.

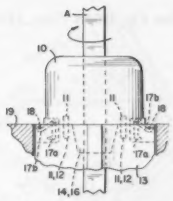
3,913,352

AUTOMATIC KELLY BUSHING HOLD-DOWN DEVICE

Don L. Oliver, Houston, Tex., assignor to Cities Service Oil Company, Tulsa, Okla.

Filed Oct. 4, 1973, Ser. No. 403,355
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F16D *3/06*
U.S. Cl. 64—23.5 **7 Claims**

6. In a drill rig an automatic apparatus for maintaining a driving connection between a kelly and its rotary table effective to permit rotation of the drill pipe while simultaneously lifting the drill pipe string and bit off the bottom comprising a driven rotary table, a drive bushing keyed to the table, a kelly bushing keyed to but separable from the drive bushing and a plurality of hooks each having a lip carried by the kelly



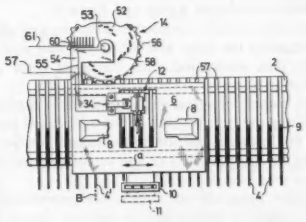
bushing operable to engage mating pins in said drive bushing in response to centrifugal force generated by rotation of the kelly bushing whereby the kelly bushing and the drive bushing are locked or coupled together, said hooks being operable to fall free of said pins in response to gravity when the drill string is at rest.

3,913,353

MANUAL KNITTING MACHINE WITH A NEEDLE SELECTOR MECHANISM

Dennis Lincoln Spencer, Turkenfeld, Germany, assignor to Knittax, Berlin, Germany

Filed Apr. 15, 1974, Ser. No. 461,097
Int. Cl.² D04B *7/00*
U.S. Cl. 66—60 **7 Claims**



1. A manual knitting machine comprising, in combination, a needle bed, a plurality of needles displaceably supported on said bed each having a butt, a slide displaceable on said needle bed perpendicularly to the direction of displacement of said needles, camming means defined on said slide cooperating with the butts of said needles to move said needles backwards and forwards to execute the knitting action, needle selector means mounted on said slide for moving specific needles out their normal position into a selecting position, control means mounted on said slide operating said needle selector means in a predetermined manner, said needle selector means comprising an adjuster wheel assembled to rotate freely on said slide, projections circumferentially distributed on said adjuster wheel and pivotal between camming and non-camming positions meshing with said needle butts whereby said wheel is rotated during movement of said slide, and braking means operable by said control means adapted to selectively stop and adjuster wheel rotation whenever a needle is to be moved to its selecting position so that said needle butts are displaced by said adjuster wheel by a camming action of said projections and said needles moved into their selecting position.

3,913,354

DESIGN KNITTING MACHINE WITH STITCH TRANSFER

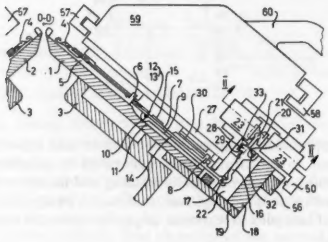
Fritz Kohler, and Andre Perotti, both of Couvet, Switzerland, assignors to Edouard Dubied et Cie (Societe Anonyme), Couvet, Switzerland

Filed Dec. 14, 1973, Ser. No. 424,994

Claims priority, application Switzerland, Dec. 14, 1972, 18184/72

Int. Cl.² D04B *7/00, 15/66*

U.S. Cl. 66—75 **9 Claims**



1. A jacquard knitting machine with a builtin stitch transfer comprising:

needlebeds arranged in paired relationship and having grooves formed therein;

a plurality of needles disposed in the grooves in the needlebed;

a plurality of needle jacks arranged in the grooves in the needlebed, said needle jacks having a butt portion thereon;

lock means having control cams positioned thereon for controlling said needles and said needle jacks;

levers disposed beneath said needle jacks, said levers being pivotally movable at a first end thereof;

platen means pivotally coupled to a second end of said lever for actuating the lever and lifting the butt portion of the needle jack associated with the lever from a lowered position to a raised position;

selection means for selectively operating said platen means and lifting the butt portion of the associated needle jacks from the lowered position to the raised position or maintaining the butt portion of the associated needle jack in the lowered position; and

crossed bar programmer means for generating selection control signals, said selection control signals being utilized to energize said selection means.

3,913,355

ARRANGEMENT OF ELEMENTS IN A KNITTING MACHINE

Heinz Lindner, Geyer, Germany, assignor to VEB Wirkmaschinenbau Karl-Marx-Stadt, Karl-Marx-Stadt, Germany

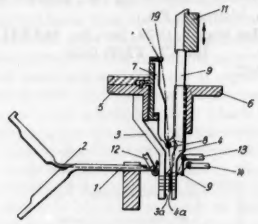
Filed June 24. 1974, Ser. No. 482,826

Claims priority, application Germany, June 22, 1973, 171745

Int. Cl.² B04B *23/06*

U.S. Cl. 66—84 R **9 Claims**

1. In a warp knitting machine for the production of double-faced pile loop fabrics in which warp threads and some of the weft threads form the base and other weft threads form the pile, the machine having cast-off sinkers in the form of rear pile loop holders, hold-down sinkers in the form of front pile loop holders, knitting needles for the base threads mounted for reciprocation between the pile loop holders, front and rear pile thread guide bars, weft guides on the front side of needles between the pile loop holders, recesses formed in the pile loop holders and pressure sinkers guided in said recesses for reciprocation substantially perpendicularly to the shafts of the needles, the improvement in which the pressure sinkers are arranged between the weft guides and the front pile thread guide bar, the front pile loop holders each have the recess for



guiding the respective pressure sinkers and the pressure sinkers are guided in the recesses in the front pile loop holders.

3,913,356

NEEDLE-SUPPORTING MECHANISM FOR PILE FABRIC-PRODUCING CIRCULAR KNITTING MACHINES

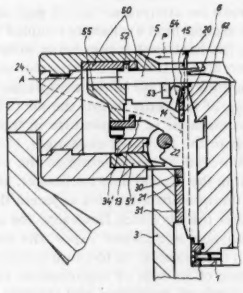
Hansjoachim Suppe, Ingolstadt, Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Germany

Filed Sept. 1, 1972, Ser. No. 285,676

Claims priority, application Germany, Sept. 2, 1971, 2143954

Int. Cl.² D04b *15/06, 27/04, 35/100*

U.S. Cl. 66—93 **4 Claims**

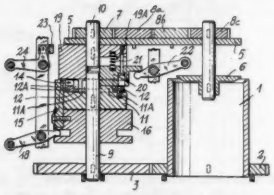


1. In a circular knitting machine for producing pile material interlaced into a mesh base including a needle cylinder, individually movable needles having needle stems, and linearly reciprocable sinkers projectible toward the needle cylinder between such needles substantially transversely of the needle lengths and retractable away from the needle cylinder for drawing pile loops and thereby exerting tension on the needles in a direction away from the needle cylinder, driving means for driving the needles and sinkers, the sinkers and needles being synchronously rotatable relative to the driving means, the improvement comprising a segmented needle-supporting ring engageable with the sides of the needle stems opposite the needle cylinder at locations closely adjacent to the sinkers.

3,913,357
DIAL OPERATED STOCKING TOE CLOSER

Francesco Lonati, Brescia, Italy, assignor to Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio) S.n.c., Brescia, Italy

Filed Dec. 13, 1973, Ser. No. 424,431
Claims priority, application Italy, Dec. 29, 1972, 5264/72
Int. Cl.² D04B *15/02*
U.S. Cl. 66—95 **4 Claims**



1. A control device for forming or closing a stocking tip on a circular knitting machine by rotating a needle cylinder relative to a dial through an angle other than 360°, comprising:

a needle cylinder having a ring gear fast therewith;

a gear wheel meshing with said ring gear;

a first shaft having said gear wheel keyed thereon;

a pinion;

a second shaft concentric to said first shaft, said pinion being keyed to said second shaft;

gears rotatably connecting said pinion with the dial associated with the needle cylinder of the circular knitting machine;

two shaped elements concentrically coupled to said first shaft and partially overlying each other, one of said shaped elements being secured to said first shaft and the other being selectively movable and rotatable with respect to said one shaped element, the surfaces of said two shaped elements facing said second shaft each comprising circular rings each ring having a slot radially extending relative to said first shaft;

a shaped body member keyed to said second shaft and having a seat;

a slide key movably positioned in said seat, said seat opening to said circular rings of said two shaped elements, where said slots are formed; and

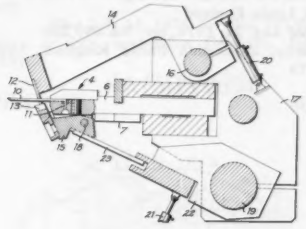
a slide key control member for controlling the slide key movement between a first position, where said slide key is inserted in one of said slots restraining said shaped body member to said shaped elements and hence the needle cylinder to the dial, and a second position where said slide key is maintained away from said slots and the dial is released from the needle cylinder.

3,913,358
VARIABLE GAUGE TRANSFER DEVICE FOR RIB BORDER KNITTING MACHINE

Prosper E. Dhondt, Wendelgem, Belgium, assignor to Fabrique Nationale Herstal S.A., Herstal-lez-Liege, Belgium

Filed Apr. 9, 1974, Ser. No. 459,395
Claims priority, application Belgium, July 12, 1973, 802224
Int. Cl.² D04B *9/40*
U.S. Cl. 66—148 **9 Claims**

1. In a flat knitting machine having knitting needles of a first gauge setting, a sinking comb device for the sinking of the loops of the last row of a knitted fabric on the needles of said machine and transferring said loops to a different gauge magazine comb, comprising, in combination, at least a pair of sinking comb point holding blocks, each block carrying at least one sinking comb point; means for supporting said blocks for relative movement towards and away from each other; means for moving said block towards and away from each other along the length of the sinking comb; means for independently connecting said points to said blocks for permitting independent movement of said points towards and away from each other at their distal ends to thereby vary the gauge setting of said points; first point gauge setting means for moving the distal ends of said points to a first gauge position; second point gauge setting means for moving the distal ends of said points

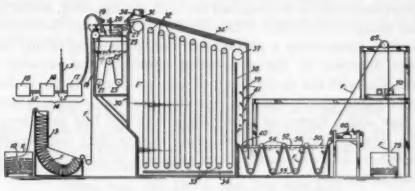


to a second gauge position; and means for actuating each of said first and second gauge setting means to cause spacing of the distal ends of said points in either of two gauge positions, said blocks being moved to a position relatively away from each other when the gauge of said points are set at a courser gauge position, and to a position relatively adjacent each other when set at a finer gauge position.

3,913,359
DYEING STATION IN AN APPARATUS FOR CONTINUOUSLY DYEING FIBROUS MATERIAL

Billy M. Childers, Chattanooga, Tenn., and Charles D. Fesperman, Jr., Dalton, Ga., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 265,227, June 22, 1972, abandoned, which is a division of Ser. No. 19,627, March 16, 1970, abandoned. This application Jan. 9, 1974, Ser. No. 431,695
Int. Cl.² D06B *3/02*
U.S. Cl. 68—183 **3 Claims**



1. In an apparatus for continuously dyeing fibrous material, a dyeing station of the type wherein a dye is continuously uniformly applied to said material, wherein the improvement comprises:

means for producing a foam containing a dye at a pressure above atmospheric pressure;

means in communication with said producing means for dispensing said foam at atmospheric pressure

a foam dye box vented to the atmosphere for receiving said foam from said dispensing means;

roller means for continuously conveying said fibrous material through said foam within said box;

said roller means including at least one roller positioned in said box;

said dispensing means being positioned above said box such that said foam is discharged into said box;

reciprocating means for transversely reciprocating said dispensing means across the breadth of said box whereby said foam is discharged into said box at a level such that said roller is covered by said foam; and

adjustable means for removing a predetermined amount of said foam from said material upon exit of said material from said foam.

3,913,360

TANNING MACHINERY

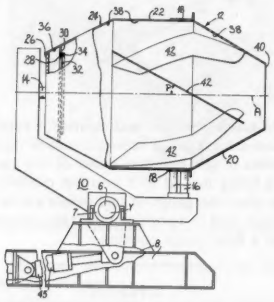
Eric Holdsworth, Leeds, England, assignor to Turner Machinery Limited, Leeds, England

Filed Aug. 21, 1974, Ser. No. 499,286

Claims priority, application United Kingdom, Aug. 25, 1973, 40366/73

Int. Cl.² C14C *15/00*

U.S. Cl. 69—30 **14 Claims**



1. A rotary drum mixing and processing machine comprising a drum having an opening at a front end portion thereof and a closed rear end portion, support means supporting the drum for rotation about an axis passing through the opening and the rear end portion, and means for tilting the drum so that the angle of the axis of rotation may be adjusted through a range of angles with respect to the horizontal, the drum having wall structure forming a processing chamber of substantially circular cross section into which materials to be processed may be introduced through the opening, said chamber being symmetrical with said axis of rotation, the machine further comprising a plurality of flat, planar, agitating members disposed in the processing chamber and secured for rotation with the drum, each of said agitating members defining a plane which, upon intersecting said wall structure, forms a line which forms an acute angle with any line produced by the intersection of a radial plane intersecting said agitating members and emanating from said axis of rotation with said wall structure.

3,913,361

DOORKNOB SECURITY DEVICE

Max Fried, 2371 Collins Ave., Apt. Mezz. 06-B, Miami Beach, Fla. 33139

Continuation-in-part of Ser. No. 406,241, Oct. 15, 1973, abandoned. This application June 3, 1974, Ser. No. 475,947

Int. Cl.² E05B *17/14*

U.S. Cl. 70—424 **2 Claims**

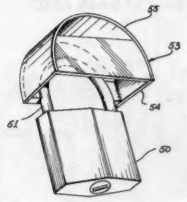
1. A unitary security device for lockable doorknobs of the type having a shaft extending lateral from a door and terminating in a bulbous grip, a key operated lock mounted within the grip having a keyhole generally axially aligned with the shaft and disposed on the face of the grip opposite to the shaft, said security device comprising in combination:

A. a U-shaped channel for receiving the grip, said U-shaped channel including

a. a centerpiece positionable adjacent the face of the grip and overlapping the keyhole, said centerpiece being of a width generally commensurate with the width of the grip; and

b. an arcuate shroud extending from opposite edges of said centerpiece, said shroud extending laterally toward the door to encase the perimeter of said grip;

B. a padlock including a shackle for straddling the shaft and a lock mechanism for selectively engaging one leg of said shackle; and



C. means securing said arcuate shroud to said shackle; whereby, access to the keyhole in the grip is inhibited by said centerpiece, and frictional engagement with said grip is prevented by said arcuate shroud.

3,913,362

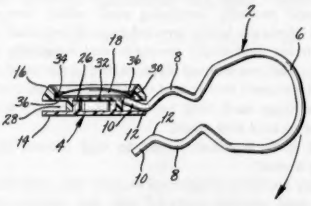
RING-TYPE HOLDER

John G. Goessling, St. Louis County, and David P. Lage, Ballwin, both of Mo., assignors to Quick Point Pencil Co., Inc., Fenton, Mo.

Filed July 22, 1974, Ser. No. 490,502

Int. Cl.² A47G *29/10*

U.S. Cl. 70—459 **10 Claims**



1. A ring-type holder for keys and the like, said holder comprising: a ring having spaced apart ends; a closure member having a slot into which the ends of the ring fit and being detachably engaged with the closure member within the slot to retain objects on the ring, the closure member further having a recess and apertures providing access to the base of the recess; and a detachable element in the recess and engaged at its periphery by the closure member, the detachable element covering the aperture in the base of the recess, whereby the element can be dislodged from the recess by inserting an implement through the aperture and applying a force to the back face of the element.

3,913,363

METHOD AND APPARATUS FOR SHAPE CONTROL OF METAL PRODUCTS IN CONTINUOUS ROLLING MILL

Seiji Fujii; Masamoto Kamata; Masayuki Ishida, and Hiroshi Kuwamoto, all of Fukuyama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1973, Ser. No. 341,579

Claims priority, application Japan, Mar. 28, 1972, 47-30962

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B21B *37/00*

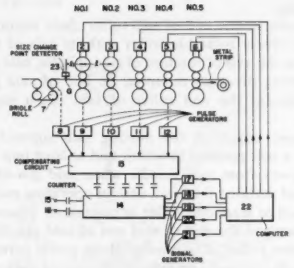
U.S. Cl. 72—10 **15 Claims**

1. A method of rolling a metal strip by means of a tandem

mill including a plurality of spaced apart mill stands comprising:

detecting a size change point of said strip prior to said size change point entering said mill stands,

successively generating pass signals when said size change point of the strip successively passes through respective mill stands,



generating control signals in response to said pass signals, and

varying the degree of roll bending of respective mill stands in response to said control signals when said size change point passes through respective mill stands.

3,913,364

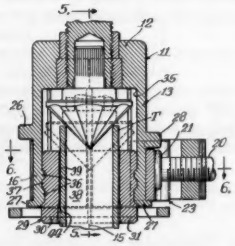
FLARING TOOL

Richard V. Strybel, Elk Grove Village, Ill., assignor to Imperial-Eastman Corporation, Chicago, Ill.

Filed July 11, 1974, Ser. No. 487,435

Int. Cl.² B21D *41/02*

U.S. Cl. 72—318 **28 Claims**



1. A tool for flaring a tube end, comprising: a body member having a yoke portion, and a plurality of apposed, spaced clamping portions extending resiliently from said yoke portion in an annular array to define a generally cylindrical jaw receiving space therebetwe n; a pair of segmentally cylindrical jaws in said space having confronting tube engaging concave surfaces defining a flaring axis; adjustable means for forcibly urging said clamping portions radially inwardly toward said axis thereby to urge said jaws inwardly into holding relationship with a tube disposed therebetween extending coaxially toward said yoke portion; cooperating shoulder means on said clamping portions and jaws for preventing axial movement of the jaws from said space when urged into said tube holding relationship; and flaring means adjustably carried by said yoke for coaxially flaring the end of the held tube, the resiliency of said clamping portions being preselected to cause radial separation of said shoulder means as an incident of release of said adjustable means to permit the jaws to be inserted axially into said space and to permit said jaws and the flared tube to be withdrawn axially from said jaw receiving space upon completion of the flaring of the tube end.

3,913,365

METHOD AND MACHINE FOR ROLLING THREADS OR THE LIKE

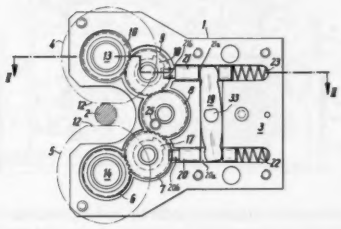
Werner Kruse, Waldhuterweg 5, 2053 Schwarzenbek, Germany

Filed July 15, 1974, Ser. No. 487,947

Claims priority, application Germany, July 13, 1973, 2335651

Int. Cl.² B21H *3/04*

U.S. Cl. 72—104 **31 Claims**



1. A method of rolling threads or analogous profiles into the peripheral surfaces of ductile round blank means with die means including a plurality of substantially cylindrical dies having profiles which are complementary to the desired profiles of blanks, comprising the steps of positioning the dies into frictional contact with the peripheral surface of a blank means while maintaining the axes of the dies at identical distances from the axis of the blank means; rotating one of said means relative to the other about the axis of the blank means so that the dies rotate about their respective axes due to frictional engagement with the blank means and complete the rolling of a profile into the peripheral surface of the blank means in response to completion of one revolution about their respective axes; and biasing said dies to predetermined angular positions which said dies assume upon disengagement of their profiles from a profiled blank means.

3,913,366

APPARATUS FOR NECKING-IN CAN BODIES

Roger Jacob Nelsen, and Earl Willard Johnson, both of Hastings, Mich., assignors to Gulf & Western Manufacturing Company, Southfield, Mich.

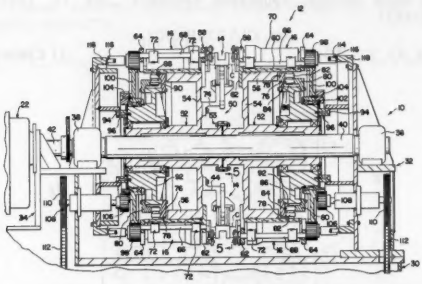
Filed May 10, 1974, Ser. No. 468,830

Int. Cl.² B21D *19/06*, *41/04*

U.S. Cl. 72—121 **17 Claims**

1. Apparatus for necking-in an end portion of a substantially cylindrical can body having a longitudinal axis, inner and outer substantially cylindrical surfaces and opposite end portions comprising: a frame, a turret rotatably supported by said frame, a plurality of circumferentially spaced can body receiving and clamping means each carried by said turret for clamping the outer cylindrical surface of a can body between said end portions thereof, a corresponding spindle on said turret for each clamping means and having a longitudinal spindle axis substantially coincidental with the longitudinal axis of a can body clamped in the corresponding can body receiving and clamping means, means supporting said spindle for rotation relative to said turret and axial displacement relative to said turret between retracted and extended positions with respect to an end portion of said can body clamped in said corresponding clamping means, said spindle having inner and outer forming rolls supported thereon for rotation about roll axes and for relative displacement of said rolls toward and away from one another, said roll axes being spaced from one

another and from said spindle axis, said inner and outer rolls in said extended position of said spindle receving said end portion of said can body therebetween, means to rotate said turret and spindle, and means operable in response to turret rotation to axially displace said spindle between said retracted and extended positions and to displace said rolls toward one another when said spindle is in said extended position for said rolls to neck-in said end portion of said can body, said rolls



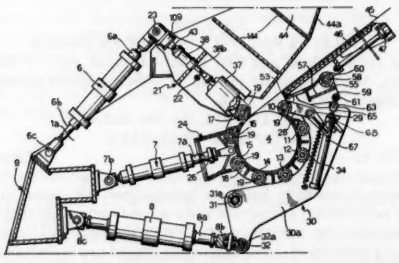
being connected with said spindle by levers pivotal about lever axes extending substantially perpendicular to said spindle axis, said means to displace said rolls toward one another including cam follower means on said levers, first cam means axially displaceable relative to said spindle and cooperable with said follower means to pivot said levers and thus said rolls, and second cam means on said frame for axially displacing said first cam means.

3,913,367

WINDING DEVICE FOR SHEET METAL STRIP

Cesare Galletti, Milan, Italy, assignor to Innocenti Santeustacchio S.p.A., Brescia, Italy

Filed Apr. 15, 1974, Ser. No. 461,048
Claims priority, application Italy, Apr. 17, 1973, 23096/73
Int. Cl.² B21C *47/00*
U.S. Cl. 72—148 **4 Claims**



1. In a winding machine for winding sheet metal strip into coils, of the type comprising a winding spindle,

a bearing structure rotatably supporting said spindle with its axis horizontal,

means for conveying sheet-metal strip towards said spindle, a slide movable mounted for movement in a direction transverse to the axis of said spindle,

means for moving said slide between a rest position spaced from said spindle and an operating position close to said spindle;

at least one chain of freely rotatable rollers positioned at one side of said spindle, the rollers of said chain extending parallel to the axis of said spindle,

at least two jaw-like arms, pivoted at one of their ends to said slide with pivot axes parallel to the axis of said spindle,

means supporting at the other ends of said jaw-like arms respectively said rollers at the ends of said chain, and

fluid pressure actuator means for effecting angular displacement of said arms around their respective pivot axes from a position spaced from said apindle to a position close to and partially surrounding said spindle, the improvement comprising:

support means at one end of said roller chain supporting at least one freely rotatable roller with its axis of rotation parallel to the axis of rotation of said spindle, said support means being pivotally mounted on one of said jaw-like arms adjacent the end roller of said chain supported thereby,

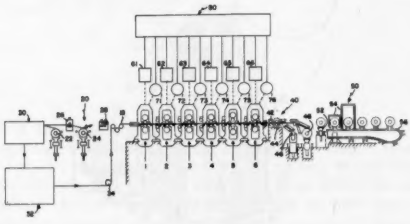
fluid pressure actuators for moving said support means between a rest position in which said at least one roller is spaced away from said spindle when said jaw-like arms are in said working position, and an operating position in which said at least one roller is positioned adjacent said spindle beyond the end of said one of said jaw-like arms as a further roller of said roller chain partly surrounding said spindle, whereby to effectively enlarge said chain to accommodate a spindle of larger diameter than that of said spindle.

3,913,368

TANDEM ROLLING MILL

Werner W. Eibe, Pittsburgh, Pa., assignor to Blaw-Knox Foundry & Mill Machinery, Inc., Pittsburgh, Pa.

Filed Sept. 4, 1974, Ser. No. 503,056
Int. Cl.² B21B *1/24, 35/04*
U.S. Cl. 72—234 **11 Claims**



1. A tandem rolling mill comprising:

a plurality of mill stands arranged in tandem in a rolling line for successively rolling a strip of material to reduce the thickness thereof a desired amount in a single pass through said mill stands,

said plurality of mill stands being adapted to roll strip in accordance with a predetermined group of pass schedules so designed that all passes of each schedule are required to produce said desired strip reduction,

an additional mill stand added to said plurality of mill stands and arranged in said rolling line,

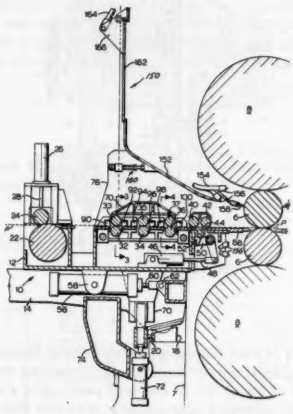
and independent drive means for each of said mill stands in said rolling line,

the drive means for each mill stand having a speed range covering most of the speed range of the drive means for a mill stand immediately upstream thereof and a maximum speed greater than the maximum speed of the drive means for a mill stand immediately upstream thereof.

3,913,369
ENTRY AND DELIVERY GUIDES FOR COLD ROLLING MILLS

Michael Frank Field, Sydney, and Charles James Cavell, Lachine, both of Canada, assignors to Dominion Engineering Works, Limited, Montreal, Canada

Filed July 30, 1974, Ser. No. 493,194
Claims priority, application Canada, Sept. 14, 1973, 181058
Int. Cl.² B21B *39/02*
U.S. Cl. 72—251 **3 Claims**



1. A unitary guide assembly in combination with a strip rolling mill which has a pair of working rolls and a pair of back-up rolls:

a plurality of pairs of guide rolls rotatably mounted in mutually opposed relation to guide a strip therebetween on passage of the strip along a pass-line through said working rolls of said mill,

guide support means supporting said assembly in spaced relation from said working rolls,

guide displacement means for moving said assembly from a working position adjacent said working rolls to a withdrawn position away from said working rolls in the direction of said pass-line to facilitate replacement of said working rolls,

a coolant enclosure substantially enclosing the upper of said back-up roll and a portion of the upper one of said working roll, and

seal means in said enclosure to substantially preclude, in operation, the downward passage of significant quantities of said coolant onto said strip passing therebeneath.

3,913,370
SUPPLEMENTAL BENDING ATTACHMENT FOR PORTABLE SHEET MATERIAL BENDING BRAKE

Douglas G. Break, 30262 Astor, Farmington, Mich. 48024

Filed Oct. 5, 1973, Ser. No. 403,816
Int. Cl.² B21D *5/04*
U.S. Cl. 72—322 **10 Claims**

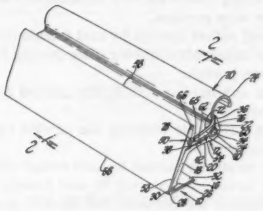
1. A supplemental bending attachment for installation in the jaws of a conventional portable bending brake to additionally bend a previously-partially bent sheet material workpiece, said attachment comprising

a horizontally-elongated upstanding stationary workpiece-clamping member having a forward workpiece-engaging face thereon,

means on said stationary workpiece-clamping member for mounting said stationary clamping member in the jaws of the conventional portable bending brake.

a horizontally-elongated movable workpiece-clamping member having thereon a rearward workpiece-engaging face and a lower workpiece-bending edge swingable toward and away from said stationary clamping member into and out of clamping engagement with a portion of a previously-partially-bent sheet material workpiece abutting said forward workpiece-engaging face,

pivot means pivotally connecting said movable clamping member to said stationary clamping member at a location spaced above and remote from said workpiece-bending edge,



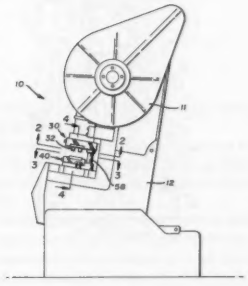
one of said clamping members having locking abutment thereon spaced away from said pivot means and disposed at a location spaced above and remote from said workpiece-bending edge of said movable clamping member,

and a movable locking member having a pivotal connection to the other clamping member disposed in spaced relationship to said pivot means and movable into and out of locking engagement with said locking abutment whereby to lock said clamping members into closed clamping engagement with the said inserted workpiece portion.

3,913,371
PROGRESSIVE PUNCH DIE

Thomas T. Thompson, 1573 Fixler Road, Wadsworth, Ohio 44281

Filed May 24, 1974, Ser. No. 473,133
Int. Cl.² B21D *43/28*
U.S. Cl. 72—324 **4 Claims**



1. A progressive punch die for producing individual articles from a strip of advancing material, comprising;

A. an elongate male punch die assembly including a male die shoe portion and having

1. a sizing station located adjacent one end of said male die shoe portion and having adjustable sizing components;

2. a slide area in said male die shoe portion having

a. a stamping station with an adjustable stamping punch,

b. a notching station with an adjustable notching punch, and

c. a piercing station with an adjustable piercing punch;

3. said stamping, notching, and piercing punches being movable interchangeably within said slide area;

4. a reversible cutoff member carried by said male die shoe portion;

5. a forming member carried by said male die shoe portion adjacent the opposed end thereof;

B. an elongate female punch die assembly including a female die shoe portion and having

1. a sizing station located adjacent one end of said female die shoe portion;

2. feed rollers carried by said female die shoe portion;

3. an adjustable stamping plate carried by said female die shoe portion;

4. an adjustable notching die carried by said female die shoe portion;

5. an adjustable piercing die carried by said female die shoe portion;

6. a cutoff die carried by said female die shoe portion;

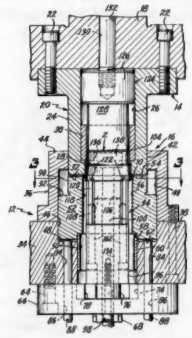
7. a forming die carried by said female die shoe portion adjacent the opposed end thereof; and

C. means for moving said male punch assembly and said female die assembly into and out of engagement with each other while simultaneously advancing said strip therebetween.

3,913,372
METHOD AND APPARATUS FOR FORMING A RECEPTACLE CLOSURE

Charles T. Baker, Rutland, Vt., assignor to Vermont Marble Company, Proctor, Vt.

Filed Nov. 1, 1974, Ser. No. 520,163
Int. Cl.² B21D *22/00, 22/21*
U.S. Cl. 72—349 **10 Claims**



1. The method of forming a blank cut from a sheet of material into a cup-shaped receptacle closure, comprising the steps of:

applying draw forming means to said blank while the periphery thereof is gripped, whereby to form a generally cup-shaped closure having an annular wastage ring thereon where the periphery of said blank was gripped;

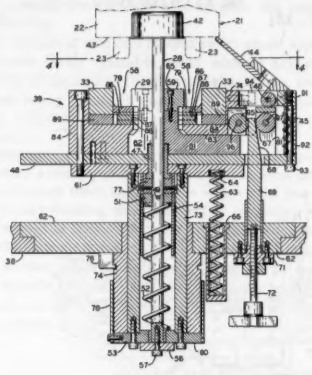
trimming said annular wastage ring from said closure at the end of said forming step; and

thereafter cutting said annular wastage ring into segments, and removing it from said draw forming means.

3,913,373
METHOD AND APPARATUS FOR FORMING WINDING END TURNS

Alan L. Kindig, Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Filed Jan. 14, 1974, Ser. No. 433,268
Int. Cl.² B21D *22/00*
U.S. Cl. 72—355 **9 Claims**

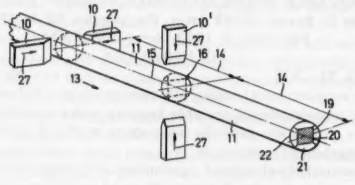


1. A method of establishing a predetermined desired form and shape of at least part of an arcuately extending envelope of at least part of a plurality of end turn portions of a number of turns of wire supported adjacent to at least one end face of a magnetic core, said method comprising substantially independently and substantially simultaneously selectively pressing preselected arcuately displaced regions of the envelope to respectively predetermined locations by (1) engaging each of the preselected arcuately displaced regions with a separately movable tool segment with each movable tool segment being movable an independently predetermined amount so that different arcuately displaced regions of the envelope will be compacted to different extents upon movement of the tool segments associated therewith; and (2) thereafter moving each tool segment its respective independently predetermined amount to establish the desired form and shape of the envelope.

3,913,374
APPARATUS FOR BEVELLING WIRE BLANKS

Paul Esser; Emil Mayer, and Paul Rahn, all of Cologne, Germany, assignors to Meyer, Roth & Pastor Maschinenfabrik GmbH, Cologne, Germany

Filed Sept. 18, 1973, Ser. No. 398,534
Claims priority, application Germany, Sept. 18, 1972, 2245771
Int. Cl.² B21J *13/02*
U.S. Cl. 72—404 **2 Claims**



1. An apparatus for bevelling a wire blank simultaneously at diametrically opposite sides from successively different directions, comprising at least two pairs of bevelling tools; the

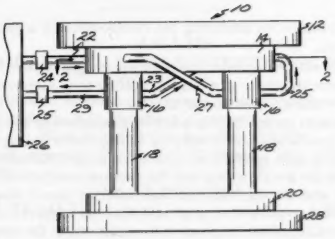
bevelling tools of each pair being arranged to move simultaneously and in opposite directions to one another into engagement with said wire blank; the direction of advance of each tool towards said blank being normal to the longitudinal axis of the blank; cutting faces provided on each tool, said cutting faces being arranged symmetrically with respect to any cross-sectional plane of said blank; a separate tool holder associated with each bevelling tool for carrying the same, each tool holder being movable towards and away from said axis in a direction normal thereto; means for pivotally securing each bevelling tool to its associated holder for a pivotal motion of the bevelling tool about an axis that is normal to and spaced from the axis of said blank; an abutment provided on each tool holder and cooperating with the tool to determine therefor a position of rest; and spring means engaging each tool holder and the associated tool for urging the tool against said abutment.

3,913,375

SELF LUBRICATING TOOL

Frederick H. Benker, Jr., Plainville, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 28, 1974, Ser. No. 473,843
Int. Cl.² B21D *37/18*; **F16N** *1/00*
U.S. Cl. 72—463 **8 Claims**



1. A self-lubricating die tool comprising at least two relatively movable die parts, a plurality of guide posts mounted in one of said die parts, a plurality of guide post bushings mounted in the other of said die parts, said bushings each having an open end for receiving respective guide posts in sliding telescoping relation therein with interfacing surfaces of said guide post and bushing in closely sliding relation to each other for guiding reciprocal movement of said die parts relative to each other, at least one of said guide post bushings having a closed end cooperating with the guide post therein during said reciprocal movement to define a well of alternately increasing and decreasing volume; a lubricant reservoir; a conduit means extending from said reservoir to said first well; a second conduit means serially interconnecting said guide post bushings; and finally a conduit means extending from last of said bushing in serial relationship to said lubricant reservoir; lubricant is drawn from reservoir through said conduit into the first well when well volume is increased and then pumped between interfacial surfaces on the decreasing volume stroke and then on to the remaining guide post and bushings through the serially connecting conduit.

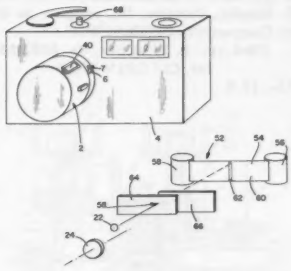
3,913,376

EXPOSURE TIME TESTING APPARATUS FOR FOCAL-PLANE CAMERAS

Thaddeus LeRoy Scott, 360 Hyde Drive, Hayward, Calif. 94544

Filed Dec. 5, 1973, Ser. No. 422,098
Int. Cl.² G04F *7/10*, *10/04*
U.S. Cl. 73—5 **2 Claims**

1. An apparatus for testing the exposure time of a camera comprising a housing means mountable upon said camera, a light reflecting means disposed within the focal plane of said camera, photosensitive photodiode means directed toward said light reflecting means, a light source disposed between said photosensitive photodiode means and said light reflective means and directed toward the latter, electronic clock timing



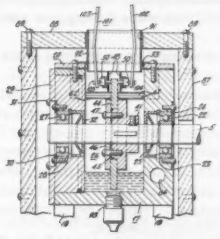
means actuable by said photosensitive photodiode means to measure said exposure time, and a digital display device driven by said electronic clock timing means to display said exposure time, said light reflecting means comprising a reflective strip mounted on a non-reflective film strip.

3,913,377

FRICTION TESTING MACHINE FOR LUBRICANTS

Myrl A. Lindeman, Newtown Square, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Dec. 17, 1973, Ser. No. 425,581
Int. Cl.² G01N *3/56*, *19/02*
U.S. Cl. 73—10 **5 Claims**



1. Apparatus for friction testing of lubricants, comprising:

a. a supporting structure;

b. a rotatable test object, rotatably mounted to the supporting structure, said test object having first and second opposing lateral sides disposed transversely from the axis of rotation;

c. first and second relatively fixed friction members;

d. holding means for holding the first relatively fixed friction member against the first lateral side of the rotatable test object and for holding the second relatively fixed friction member against the second lateral side of the rotatable test object and directly opposite the first friction member;

e. means for applying force to the friction members to urge each friction member against the rotatable test object, thereby creating a frictional force urging the holding means in one tangential direction when the rotatable test object is rotated;

f. means for applying test lubricant between the relatively fixed friction members and the rotatable test object;

g. means for rotating the rotatable test object; and

h. means to detect the force urging the holding means in a tangential direction, thereby determining the frictional

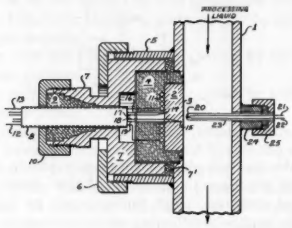
force produced between the relatively fixed friction members and the rotatable test object.

3,913,378

APPARATUS FOR MEASURING FOULING ON METAL SURFACES

Rudolf H. Hausler, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 8, 1974, Ser. No. 459,252
Int. Cl.² G01N 25/00
U.S. Cl. 73—15 R **4 Claims**



1. Apparatus for measuring the fouling of a metal surface exposed to the flow of a liquid stream by providing for means detecting an electrical signal responsive to the heat transfer taking place from a heated metal piece into a liquid stream passing over one face thereof and for dividing such signal into an electrical signal indicative of the differential temperature through the thickness of the metal piece, which comprises in combination:

a. means for mounting said metal piece to insulate it from ambient conditions while having one surface exposed to said stream;

b. means for providing a constant heat input into said metal piece;

c. means for measuring the temperature differential across the depth of said piece and providing an electrical output representative thereof;

d. means for measuring variations in temperature for the convected heat across the interface between the liquid and the exposed surface of said metal piece and for generating an electrical output therefrom indicative of the temperature being measured;

e. electrical divider circuit means for receiving the measurements of (c) and (d) and for reading out a resultant electrical signal indicative of changes in the ratio between the metal piece temperature differential and the temperature differential across the interface between the metal piece and the liquid flow to, in turn, provide a measurement of the fouling of the exposed metal surface;

f. spaced apart thermocouples, positioned to obtain temperature effects from the opposing faces of said metal piece, having leads to similar metal portions of said thermocouples interconnected to thereby provide for a voltage output signal indicative of temperature differential across the depth of said piece; and

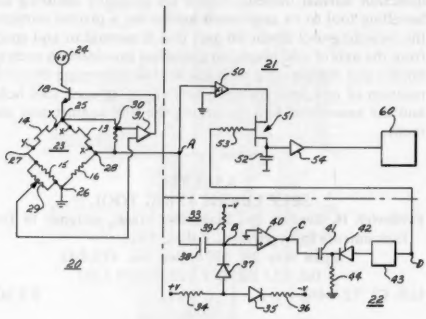
g. an additional thermocouple means positioned to have a juncture in the liquid stream spaced from the exposed surface of said metal piece to receive convective heat from said surface, there being an interconnection of a lead from the metal forming the thermocouple juncture which is similar to said interconnected similar metal portions of said thermocouple junctures providing the differential temperature through said metal piece, whereby to further provide a voltage signal in turn representative of the convected temperature from said exposed surface of said metal piece.

3,913,379

DYNAMIC GAS ANALYZER

Tibor Rusz, 3033 Doyne Road, Pasadena, Calif. 91107, and Elliott Jacobson, 237 Carolwood Drive, Arcadia, Calif. 91006

Filed Oct. 18, 1973, Ser. No. 407,540
Int. Cl.² G01N 25/18
U.S. Cl. 73—27 R **9 Claims**



1. Apparatus for analyzing the composition of a gas, which comprises:

a unidirectional gas flow passage for the gas to flow through intermittently to provide alternating time intervals of gas flow and no-flow conditions;

transducer means having a sensor positioned in the passage for producing a time-varying analog electrical signal that during each gas flow interval has a magnitude affected by both the gas flow rate and the thermal conductivity of the gas and during each no-flow interval has a magnitude directly representative of said thermal conductivity;

first circuit means responsive to variations in the time-varying electrical analog signal for producing a digital sample control signal to indicate the end of each gas flow interval; and

second circuit means enabled by each sample control signal to detect the magnitude of the time-varying analog electrical signal during each succeeding no-flow interval.

3,913,380

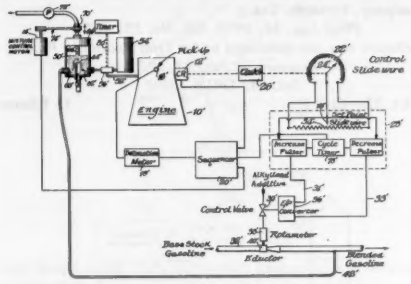
MONITORING AND BLENDING OF LIQUID FUEL

John T. Jones; William C. Ludt, and Hudson W. Kellogg, all of Dobbs Ferry, N.Y., assignors to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 886,458, Dec. 19, 1969, Pat. No. 3,690,851, and a continuation-in-part of Ser. No. 377,192, June 23, 1964, said Ser. No. 886,458, Division of Ser. No. 617,754, Jan. 24, 1967, Pat. No. 3,485,598, which is a continuation-in-part of said Ser. No. 377,192, and Ser. No. 299, 583, Aug. 2, 1963, abandoned, and Ser. No. 205,015, June 25, 1962, Pat. No. 3,383,904, said Ser. No. 377,192, Continuation-in-part of said Ser. No. 299,583, and Ser. No. 205,015. This application Sept. 5, 1972, Ser. No. 286,230
Int. Cl.² G01N 33/22
U.S. Cl. 73—35 **7 Claims**

1. In the process of in-line blending of liquid fuel, the improvement according to which the moving stream of blended fuel has its knock characteristics monitored by continuously operating a knock testing engine on a small sample stream of said fuel and on a reference fuel so as to cause knocking of the engine, automatically switching the supply of said fuels to the engine for such operation so that the engine operates alternately on the respective fuels, continously flowing the sample stream through a level-determining carburetor so that it is carburetted into the engine from a predetermined hydrostatic

head, generating from the engine a signal indicative of the relative knock characteristics of the sample fuel, and continuing the flow of the sample stream to the carburetor while the engine is operating on the reference fuel.



3,913,381

METHOD AND APPARATUS FOR TESTING CIGARETTES OR THE LIKE

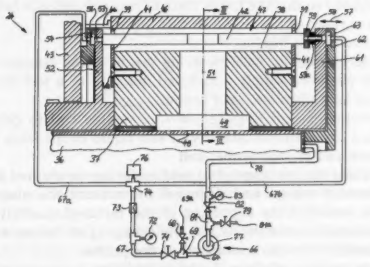
Uwe Heitmann, Hamburg, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed July 5, 1973, Ser. No. 376,929

Claims priority, application Germany, July 12, 1972, 2234094

Int. Cl. G01m *3/26*

U.S. Cl. 73—45.1 **20 Claims**



1. A method of testing cigarettes or analogous articles having or consisting of open-ended tubular wrappers, comprising the steps of maintaining a first body of gas in the interior of the wrapper of an article to be tested at a first pressure; simultaneously maintaining a second body of gas around the wrapper of said article to be tested at at least one second pressure, one of said first and second pressures exceeding and the other of said first and second pressures being less than atmospheric pressure so that the gas flows from the higher-pressure body, through the leaky part or parts of a defective wrapper, and to the lower-pressure body whereby the pressure of gas in said lower-pressure body increases and the pressure of gas in said higher-pressure body decreases; and monitoring the changes of gas pressure in at least one of said bodies.

3,913,382

LEAKAGE TEST APPARATUS FOR TUBULAR BODIES

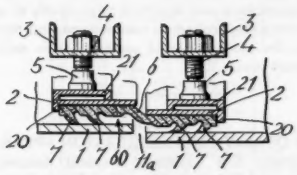
Yukiteru Kurose, Tokyo, and Noriroo Shimizudani, Yokohama, both of Japan, assignors to The Victaulic Co. of Japan, Tokyo, Japan

Filed Sept. 12, 1973, Ser. No. 396,408

Claims priority, application Japan, Sept. 21, 1972, 47-108954[U]

Int. Cl.² G01M *3/08*

U.S. Cl. 73—46 **4 Claims**



1. A leakage test apparatus for a tubular body comprising a continuous packing member applied to the interior surface of a tubular body; plural connected supporting members provided concentrically to the interior of said packing member and a series of arcuate pressing members between said packing member and said supporting members; said packing member having axially spaced lips contacting the inerior surface of said tubular body to provide a hollow space therebetween for receiving fluid under pressure; said supporting members being divided radially into multiple parts and connected to each other by means of bolts; said pressing member being positioned over each said lip portion of said packing member in series; each pressing member comprising a shoe, and a pressing means connected to said supporting member; said lips being inclined toward each other and into said hollow portion and having a sharp edge seal against said tubular body interior surface,

a connector plate projecting from one end of said pressing members and supported on the concave surface thereof, receiving means at the other end of said pressing members for receiving the projecting portions of the connector plate of an adjacent member to form a complete circle of pressing members and connector plates.

3,913,383

METHOD AND APPARATUS FOR TESTING THE CONTENTS OF PACKAGES CONTAINING LIQUID PRODUCTS

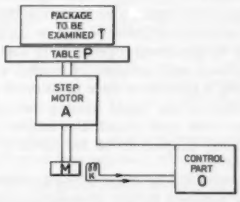
Matti Siimoni Kreula, and Tauno Vihtori Moisio, both of Helsinki, Finland, assignors to Valio Meijerien Keskusosuusliike, Helsinki, Finland

Filed Mar. 6, 1974, Ser. No. 448,646

Claims priority, application Finland, Mar. 9, 1973, 731/73

Int. Cl.² G01N *11/00*

U.S. Cl. 73—52 **9 Claims**



1. An apparatus for testing the condition of the contents of sealed packages containing liquid food products having physi-

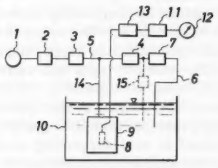
cal properties changing as a consequence of the deterioration of said products, comprising a rotatable support for a package to be tested, a step motor connected to said support, means for energizing said step motor for a preselected short time period, a magnet attached to the shaft of said step motor, an electromagnetic coil for inducing a voltage in response to the movement of said magnet during said time period, an electronic control device for evaluating said voltage, for generating a first signal in response to said evaluated voltage, for comparing said first signal with a predetermined reference signal and for generating one of second and third signals in response to said comparison, said second and third signals indicating acceptance and rejection respectively of said package, and means responding to said second and third signals respectively for removing said package from said support along different routes.

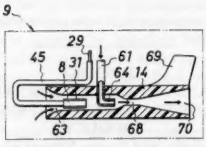
3,913,384

WATER QUALITY DETERMINATION APPARATUS

Noboru Furuya; Eiji Fujimoto; Kenichi Amano; Tsuneo Tsukamoto, and Nobuyuki Sato, all of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Jan. 28, 1974, Ser. No. 437,350
Int. Cl.² G01N *33/18*
U.S. Cl. 73—53 **27 Claims**





1. Apparatus for determining amounts of matter in a liquid to be examined, which amounts serve as indices of the characteristics of the examined liquid, said apparatus comprising:

a. sensing means comprising a housing having a flow path for passage of the liquid to be examined therethrough and a sensor element accommodated in said housing and adapted to be immersed together with said housing in the liquid to detect said amounts of matter, said sensor element having a sensing surface positioned parallel to the flow direction of the liquid passing through the housing for contact with said liquid, the output of said sensor element being adapted to be indicated by an indicating means; and

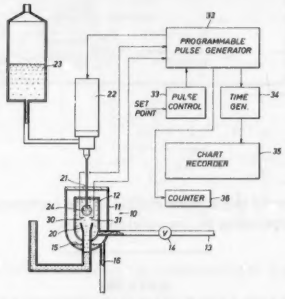
b. means for moving said liquid along said flow path including means disposed in said housing downstream of said sensing surface for introducing a medium into said liquid downstream of said sensing surface to advance the liquid along said flow path.

3,913,385

MONITOR FOR DETECTING SURFACTANTS IN LIQUID PETROLEUM PRODUCTS

John D. Jobe, Deer Park, Tex. 77536, assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 16, 1973, Ser. No. 351,735
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G01N *13/02*
U.S. Cl. 73—61.1 R **11 Claims**



1. A monitor for continuously monitoring a liquid hydrocarbon for the presence and/or amount of a surfactant, said monitor comprising:

a sample cell;

flow means communicating with said sample cell for supplying a continuous sample of said liquid hydrocarbon to said sample cell at a constant rate;

a tubular probe member, said probe member being mounted so that the lower end of the probe extends below the surface of the liquid in said sample cell;

a source of test liquid;

a metering means, said metering means being coupled to said probe to supply a metered quantity of a test liquid from said source to said probe;

a detecting means disposed in said sample cell to detect when the metered quantity of test liquid drops from the lower end of said probe; and

measuring means coupled to said metering means and said detecting means and disposed to measure the elapsed time between the supplying of the metered quantity of test liquid to the probe and the dropping of the metered quantity from the lower end of the probe.

3. The monitor of claim 1 and in addition a programming means coupled to said measuring means and said metering means to control the supplying of a sample to said probe means.

3,913,386

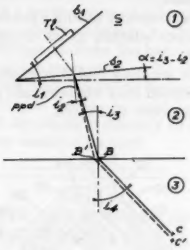
METHOD OF COMPENSATION FOR THE ANGLE OF REFRACTION OF AN ULTRASONIC BEAM AND A DEVICE FOR THE APPLICATION OF SAID METHOD

Robert Saglio, Massy, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jan. 10, 1974, Ser. No. 432,308
Claims priority, application France, Jan. 16, 1973, 73.1465
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.5 R **7 Claims**

1. A method of compensation for the angle of refraction of an ultrasonic beam in a test-piece as a function of temperature, wherein said method consists in interposing two refrac-

tion media between the ultrasonic transducer and the test-piece, the velocity of propagation of the ultrasonic beam in



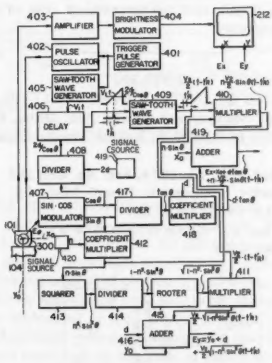
said media being such as to vary inversely as a function of temperature.

3,913,387

ULTRASONIC FLAW DETECTOR

Soji Sasaki; Masaharu Tadauchi, and Takashi Ito, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed July 11, 1973, Ser. No. 378,187
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S **11 Claims**



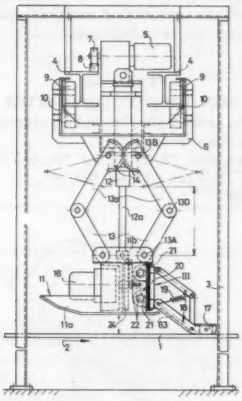
1. An ultrasonic flaw detector comprising a variable angle beam probe for transmitting and receiving an ultrasonic beam and effecting either sector scan or a combination of sector scan and transfer scan of an object, said variable angle beam probe being maintained in acoustic contact with said object and generating an electrical signal corresponding to the direction of transmission and reception of the ultrasonic beam, display means for displaying an acoustic sectional image of said object by means of a scanning line corresponding to the transmission path and velocity of said ultrasonic beam within said object, said scanning line being brightness-modulated by an echo signal associated with said ultrasonic beam, said echo signal being received by said variable angle beam probe from said object, means responsive to said electrical signal for calculating the time required for said ultrasonic beam to go from said variable angle beam probe to the incident point of said object and return from said incident point to said variable angle beam probe, means for generating an output signal corresponding to the refraction of said ultrasonic beam at said incident point and the transmission speed of said ultrasonic beam within said object, and means for generating said scanning line for said display means in response to the outputs from said time calculating means and said means for generating said output signal.

3,913,388

APPARATUS FOR ULTRASONIC TESTING OF METALLIC SHEETS OR THE LIKE

Klaus Berner, Salzgitter-Lebenstedt; Jorg Kügler, Wolfenbuttel, and Hans-Günther Grote, Salzgitter-Lobmachtersen, all of Germany, assignors to Stahlwerke Peine-Salzgitter Aktiengesellschaft, Peine, Germany

Filed July 18, 1974, Ser. No. 489,950
Claims priority, application Germany, July 27, 1973, 2338163
Int. Cl.² G01N 29/04
U.S. Cl. 73—67.8 S **37 Claims**



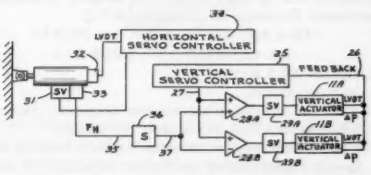
1. Apparatus for ultrasonic testing of metallic sheets, bands or analogous workpieces which are transported in a predetermined direction along a predetermined path comprising a frame; a carriage mounted in and movable relative to said frame transversely of said path; a support; a displacing device connecting said carriage with said support and arranged to move at least a portion of said support toward and away from said path; at least one linkage movably mounted on said support; a probe holder mounted on said linkage; and means for oscillating said linkage and said probe holder with respect to said support substantially transversely of said path.

3,913,389

OVERTURNING MOMENT COMPENSATION IN A MULTIPLE ACTUATOR CONTROL OF A RIGID TABLE

Rodney L. Larson, Minnetonka, Minn., assignor to MTS Systems Corporation, Minneapolis, Minn.

Filed July 29, 1974, Ser. No. 492,451
Int. Cl.² G01N 29/00
U.S. Cl. 73—71.6 **5 Claims**



1. A control system for a test apparatus comprising a test device, a plurality of first actuator means for supporting said test device and for reciprocating said test device in opposite directions along a first axis, second means for vibrating said test device in opposite directions along a second axis substantially perpendicular to said first axis, said second means applying force along a force line that is spaced in a direction along

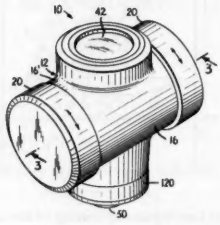
the first axis from the center of gravity of said test device, some of said first actuator means being spaced on said test device along said direction of force line from said second means, first control means connected to control said first actuator means and second control means connected to control said second means, and means to provide signals to said first control means to compensate for overturning moments acting on said first actuator means due to the offset of the center of gravity from said force line of said second means including feedback means connected to the second means to determine the force exerted by said second means, means connected to said feedback means to provide a signal indicating the rate of change of said force exerted by said second means to modify the operation of said first actuator means as a function of said rate of change signal.

3,913,390

APPLANATION TONOMETER

Carmelo Piazza, Jackson Heights, N.Y., assignor to Mel Optics Company, Jackson Heights, N.Y.

Filed Mar. 18, 1974, Ser. No. 451,798
Int. Cl.² A61B *3/16*
U.S. Cl. 73—80 **11 Claims**



1. A direct view applanation tonometer comprising:

A. a housing defining upper and lower passages in visual communication with each other and having vertically aligned axes; and

B. applanating means comprising fiber optic material slidably mounted in said lower passage for reciprocal movement parallel to the axis thereof and including an applanating surface disposed on the lower end thereof and a reticule of reference markings disposed on the upper end thereof, at least portions of said applanating surface and said reticule being viewable through the top of said housing.

3,913,391

STRAIN GAGE CONFIGURATIONS EMPLOYING HIGH DI-ELECTRIC STRENGTH AND EFFICIENT STRAIN TRANSMISSION

Anthony D. Kurtz, Englewood, N.J., assignor to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Filed Apr. 22, 1974, Ser. No. 462,614
Int. Cl.² G01N *3/00*; G01B *7/18*
U.S. Cl. 73—88.5 R **12 Claims**

1. In combination,

a. first and second piezoresistive elements, each having contacts on a first and second end thereof,

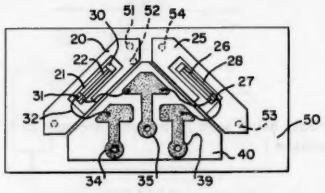
b. a thin planar member fabricated from a metallic material having a temperature coefficient, substantially matching the temperature coefficient of said piezoresistive elements, said member having a piezoresistive accommodating recess on a surface thereof, said recess capable of accommodating a liquid frit,

c. a glass bond securing said first and second piezoresistive elements within said recess of said planar member, with one of said contacts on an end of said first and second elements being connected together, said bond formed from a glass that devitrifies upon passing from a liquid frit stage to a solid stage,

d. a substrate member having a plurality of terminal areas mounted thereon,

e. a force effected member having a predetermined area of a surface thereof adapted to be monitored as to force intensity,

f. first means for securing said thin planar member within said predetermined area whereby said piezoresistors are operative to measure said force,



g. second means for securing said substrate member in close proximity to said thin planar member within said predetermined area, and

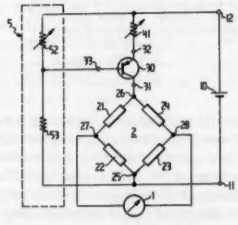
h. means coupling said other contacts of said first and second piezoresistive elements to said terminal areas on said substrate to thereby form a force responsive circuit configuration within said predetermined area of said force effected member.

3,913,392

PHYSICAL QUANTITY DETECTING CIRCUIT

Hiroshi Nagase, Nagoya, and Hitoshi Ban, Ohbu, both of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Filed Mar. 12, 1974, Ser. No. 450,285
Claims priority, application Japan, Mar. 15, 1973, 48-30344; Mar. 15, 1973, 48-30345
Int. Cl.² G01B *7/18*; G01R *17/14*
U.S. Cl. 73—88.5 SD **21 Claims**



1. A circuit for detecting a physical quantity, comprising:

a detecting circuit including at least one semiconductor sensitive element, two input terminals and two output terminals, said semiconductor sensitive element having a resistivity which is variable in proportion to temperature and to the magnitude of a physical quantity to be applied thereto,

power supply means having two output terminals,

transistor means having an emitter, a base and a collector conected to one input terminal of said detecting circuit, said transistor means having predetermined temperature characteristics and being disposed adjacent to said semiconductor sensitive element of said detecting circuit so as to be subjected to the same ambient temperature,

means for applying a predetermined voltage connected to said base of said transistor means, and

first resistor means having a predetermined resistance value connected to one terminal of said power supply means and said emitter of said transistor means,

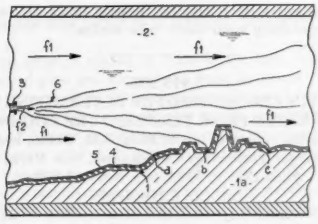
thereby compensating a shift of sensitivity of said detecting circuit due to a temperature change of said at least one semiconductor sensitive element by the characteristics of the voltage change between the base and emitter of said transistor means in proportion to the change of the ambient temperature, and generating between said two output terminals an output voltage precisely in proportion to the magnitude of the physical quantity to be applied to said semiconductor sensitive element.

3,913,393

EMULSION LAYER OF COLOURED INDICATORS FOR DETERMINING SPECTRA OF THE EFFECTS OF A FLUID ON A SURFACE

Leopold Facy, Bures-sur-Yvette, France, assignor to Omnium Technique d'Administration et de Gestion O.T.A., Tours, France

Filed Mar. 6, 1972, Ser. No. 231,983
Int. Cl. B29c *1/04*
U.S. Cl. 73—105 **10 Claims**



1. A mock-up comprising: a surface having contours produced, by mathematical similarity methods, from a given geometrical site; a gelatin layer spread over said surface and containing colored indicators sensitive to reagents contained in a fluid flowing over said contours; and a thin, transparent, semi-permeable membrane over said layer selectively permitting certain molecules or ions to pass through said layer and contact said colored indicators whereby an indelible spectrum of the effects produced by the flow of said fluid on said contours is obtained.

3,913,394

TESTING OF AIRCRAFT EQUIPMENT

Horst Niehaus, Bremen, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed May 9, 1974, Ser. No. 468,219
Claims priority, application Germany, May 18, 1973, 2325210
Int. Cl.² G01M *15/00*
U.S. Cl. 73—118 **13 Claims**

1. Equipment for testing secondary power generation machines and other auxiliary equipment, comprising:

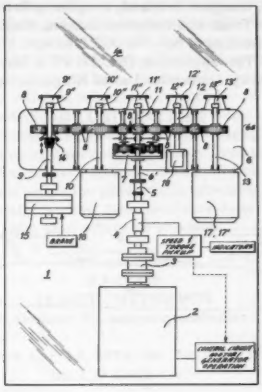
a base; an electric drive motor mounted on the base;

circuit means connected to run the motor at a controlled speed or as electric power producing load, the circuit means being further constructed to simulate starting of an aircraft engine, operating the motor as drive load with change over to motive power assist motor operation;

a distribution gear having a plurality of shafts interconnected for rotation by a gear train;

means including a pick up shaft connecting one of the shafts of the plurality to the motor and provided for measuring speed and torque; and

a casing for the distribution gear having a plurality of flanges for connection to individual machines and equipment to be tested and to be drivingly connected individually to the said shafts.

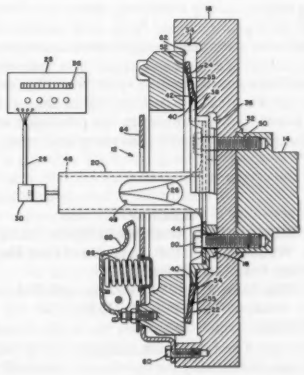


3,913,395

TEST FIXTURE FOR DETERMINING STATIC AND DYNAMIC LOADING ON CLUTCH PLATES

Roger Dean Brooks, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed May 25, 1973, Ser. No. 363,892
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G01M *19/00*
U.S. Cl. 73—118 **8 Claims**



1. A test fixture for measuring the pressure exerted by a pressure plate of a clutch pressure plate assembly during stationary and rotational operation comprising:

a. a rotative engaging member;

b. means for selectively rotating said engaging member;

c. means for connecting said pressure plate assembly to said engaging member for rotation therewith;

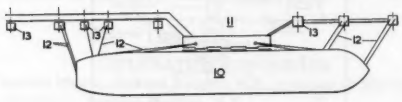
d. sensing means for sensing pressure between said pressure plate and said engaging member and providing a signal proportional thereto and inserted between said pressure plate and said engaging member for rotation therewith.

3,913,396

MONITORING SYSTEM FOR MOORED FLOATING VESSELS

George Elliot, Glasgow, Scotland, assignor to British Secretary of State for Trade and Industry, London, England

Continuation of Ser. No. 355,111, Apr. 27, 1973, abandoned. This application Dec. 27, 1974, Ser. No. 537,009
Claims priority, application United Kingdom, Apr. 28, 1972, 19838/72
Int. Cl.[2] G01L *5/10*
U.S. Cl. 73—143 6 Claims



4. A monitoring system for a floating vessel moored by a plurality of mooring ropes to respective anchoring devices disposed at widely spaced locations on a shore-based or otherwise relatively fixed installation, each anchoring device including a releasable portion for separable engagement with its associated mooring rope and each anchoring device also including an anchoring portion spaced from said releasable portion by an intervening body portion for fixedly attaching said anchoring device to the relatively fixed installation, a tension meausring device attached to a region of the intervening body portion of each anchoring device in which the tension is related to the tension in the mooring rope associated with that anchoring device, each tension measuring device producing a signal in accordance with the tension, a monitoring station, and means for transmitting the signals from all of said tension measuring devices to the monitoring station, said monitoring station having indicating means for indicating the strength of the signal received from each tension measuring device relative to the signal strength produced when the tension in the anchoring device and hence in its respective mooring rope reaches a predetermined value, whereby the monitoring system can be used to assist control of the vessel and/or individual mooring ropes to reduce the possibility of the tension in any rope reaching said predetermined value.

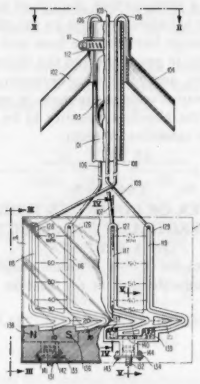
3,913,397

STATIC WIND SPEED AND DIRECTION INDICATOR

William A. Williams, Oak Hill Apts. No. 422-S Hagy's Ford Road North, Penn Valley, Pa. 19072

Filed Mar. 28, 1974, Ser. No. 455,901
Int. Cl.[2] G01P *5/16*; G01L *7/18*
U.S. Cl. 73—189 8 Claims

1. A wind speed and direction indicator comprising:
first and second mutually perpendicular, bilaterally responsive wind sampling means;
first and second interconnected fluid receptacle means corresponding respectively to said first and second wind sampling means;
an indicating liquid filling said receptacle means; and
two pairs of vertically extending manometer tube means having liquid-level indicating indicia thereon, each pair being supplied with fluid at bottom ends from a different one of said receptacle means and being coupled at a top end to receive wind pressure from a different one of said sampling means, each tube means of a pair being responsive to the pressure of wind in the opposite direction as its pair mate, said manometer tube means having a transversely inclined portion joining the top of their corresponding receptacle means, said receptacle means each



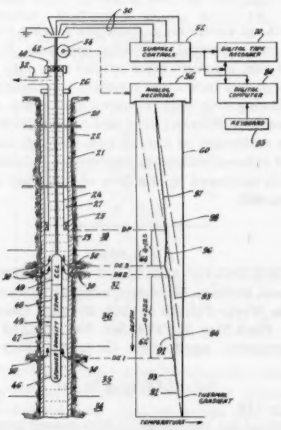
having top surface portions sloping upwardly into their corresponding manometer tube means.

3,913,398

APPARATUS AND METHOD FOR DETERMINING FLUID FLOW RATES FROM TEMPERATURE LOG DATA

M. Rex Curtis, deceased, late of Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Oct. 9, 1973, Ser. No. 404,839
Int. Cl.[2] E21B *47/06*
U.S. Cl. 73—154 41 Claims

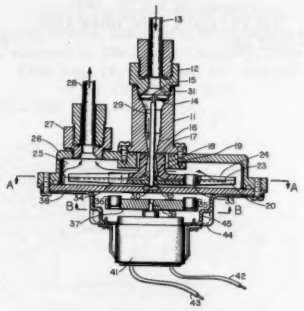


1. A method of automatically determining flow characteristics of fluids entering a substance flow path comprising:
producing measurements representative of the temperature of a fluid flowing in a subsurface flow path surrounded by a subsurface heat conductive media;
adjusting a given model for heat transfer between said subsurface heat conductive media and said flowing fluid to fit at least a portion of said measurements; and
determining at least one flow rate characteristic of said fluid using said adjusted model.

3,913,399
RATE-OF-FLOW METER WITH ATTACHED GENERATOR

Oliver P. Sheeks, 141 W. Brookshire, Orange, Calif. 92665

Filed July 8, 1974, Ser. No. 486,610
Int. Cl.² G01F *1/10*
U.S. Cl. 73—229 **8 Claims**



1. A rate-of-flow meter with attached generator, comprising:

a tubing adaptor means to receive the inlet fluid from a standard pipe and expand the fluid for proper reception by a filter; a fluid filtering means disposed immediately downstream from said adaptor means for restricting passage of foreign particles which are large enough to clog the meter, a pin shaft bearing means disposed midstream at an upstream end of an entrance tube for retaining a jet wheel assembly composed of a rotating jet wheel support shaft and a rotating jet wheel at the longitudinal centerline of said tube, a Venturi tube pressure reducing means whereby fluid velocity is increased by fluid convergence to locally reduce the pressure at exit end of said Venturi tube to approximate the fluid pressure in an outlet chamber surrounding a jet wheel assembly thereby effecting a low-friction rotary fluid seal means in the radial gap between said Venturi tube and said jet wheel assembly, wherein said low-friction rotary fluid seal functions substantially as a seal because of low fluid pressure differential radially across said gap from said inlet stream to said outlet chamber, said low pressure differential condition producing maximum metering efficiency being inherent in the meter design upon sizing of flow tube elements to satisfy said design by equation

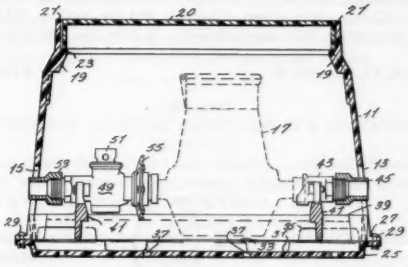
$$C_2 n^2 \left(\frac{A_2}{A_2}\right)^2 \left[1-\left(\frac{A_2}{A_1}\right)^2\right] - C_4\left[1-\left(\frac{A_2}{A_3}\right)^2\right] = 0$$

where C_2 and C_4 are Venturi and nozzle discharge coefficients respectively, n represents the number of nozzles utilized in the design, and A_1, A_2, A_3 and A_4 are respective cross sectional areas of the inlet tube, Venturi constriction, nozzle entrances, and jet openings; said jet wheel assembly embodying a fluid diffuser means for recovering fluid pressure lost in said upstream pressure reducing means prior to delivery of fluid to downstream and radially disposed nozzles at substantially the original inlet pressure; said jet wheel assembly also embodying a set of n torque producing means disposed radially at the periphery of a jet disc and aligned to direct the jet stream substantially tangential to said jet wheel assembly and in the horizontal plane of the jet wheel assembly; a combined shaft coupling and bearingseating means provided by a pair of magnets disposed at equal radial distance from said support shaft in said jet wheel assembly and a complimentary pair of magnets embodied in a generator shaft coupler located opposite a non-ferrous isolator plate, the magnetic strength and lateral displacement of said magnets being sufficient to provide the coupling torque required to make the generator shaft follow the jet wheel assembly rotation, additionally the magnetic strength being sufficient to provide positive downward seating force of the point bearing in a point bearing seat and to consequently maintain positive clearance in said fluid gap maintaining said low-friction rotary fluid seal, a voltage generating means attached to said coupler thereby providing an output voltage which is substantially proportional to the rate of flow of fluid through the meter, said voltage generating means being provided with and acted upon by a magnetic slot compensator means disposed peripherally from the shaft end of the generator whereby torque retardation caused by magnetic slot effects within the generator is substantially compensated magnetically to allow the rate-of-flow meter to function at lower flow rates than otherwise practical.

3,913,400
PLASTIC METER BOX

Carl E. Floren, Decatur, Ill., assignor to Mueller Co., Decatur, Ill.

Filed Apr. 10, 1974, Ser. No. 459,790
Int. Cl.² G01F *15/14*
U.S. Cl. 73—273 **10 Claims**



2. A plastic meter box for housing a meter below the ground level comprising

a side wall enclosure having at least two openings therein proximate the bottom thereof for receiving means for conducting fluid with respect to said meter,

a base plate fixedly secured to said side wall enclosure to form a chamber for housing said meter, said base having a plurality of holes therethrough for permitting the egress of fluid with respect to said meter box,

a meter supporting yoke supported in said base plate,

means for maintaining said meter box from moving laterally when in position,

means including said base plate for maintaining said yoke in a predetermined position in said meter box, and

means for maintaining said yoke and meter raised with respect to the water passing through said holes.

3,913,401
MOUNTING APPARATUS

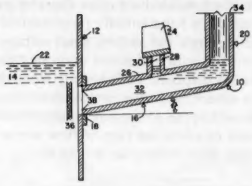
William T. Sweeney, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 25, 1974, Ser. No. 454,043
Int. Cl.² G01F *23/02*
U.S. Cl. 73—299 **8 Claims**

1. A mounting apparatus for positioning a liquid level sensor on a liquid-containing vessel to determine liquid levels accurately, said liquids optionally containing particulate material, wherein said mounting device comprises:

a. tubular member positioned in fluid communication with said liquid-containing vessel;

b. a standpipe and a pressure damping means in fluid communication with said tubular member; and,



c. means for mounting a fluid level and pressure sensing means in fluid communication with said tubular member.

3,913,402

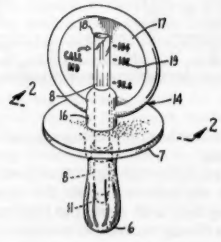
THERMOMETER PACIFIER

Barbara J. Doyle, 1224 Euclid, Santa Monica, Calif. 90404

Continuation-in-part of Ser. No. 503,366, Sept. 5, 1974, abandoned. This application Oct. 9, 1974, Ser. No. 513,219

Int. Cl.² G01K *1/08;* **A61J** *17/00*

U.S. Cl. 73—343 R **5 Claims**



1. A temperature sensitive device especially adapted for ascertaining a child's temperature comprising:

a. a tubular member extending through the device and having a first end and a second end, said first end having a slot therein permitting limited compression of said first end,

b. a clinical thermometer mounted in said tubular member and having a temperature responsive body therein adjacent to the said first end of the tubular member,

c. a flexible nipple having an end thereof mounted on said tubular member and extending over said first end and providing an enclosure for said first end,

d. a flexible disc mounted on said tubular member intermediate the ends thereof and adjacent to that end of the flexible member which is mounted on the tubular member,

e. and a protective member mounted on the second end of the tubular member and providing a protective support for the clinical thermometer, said protective member having an opening therein for viewing the thermometer.

3,913,403

TEMPERATURE MEASUREMENT WITH THREE-LEAD RESISTANCE THERMOMETERS BY DUAL CONSTANT CURRENT METHOD

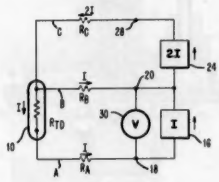
Samuel A. Arcara, North Wales, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Oct. 11, 1973, Ser. No. 405,360

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G01K *7/24;* **H04B** *3/10*

U.S. Cl. 73—362 AR **10 Claims**



1. A system for measuring a voltage change indicative of the temperature change detected by a three-lead resistance thermometer having three leads including potential leads connected to opposite ends of the resistance thermometer element and a current lead connected to one of said ends, comprising:

means for producing constant currents in said element, said potential leads and said current lead such that current of a certain magnitude flows through said element and each of said potential leads and a current of twice said certain magnitude flows through said current lead with the current through each of said potential leads being in the same direction with respect to said element, and

voltage measuring means connected between said potential leads to measure the voltage change.

3,913,404

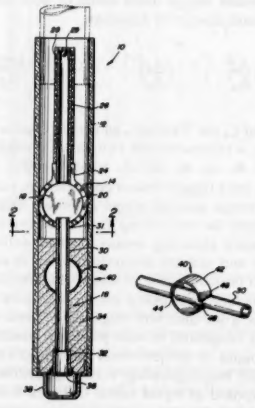
SAMPLING DEVICE

Joseph J. Boron, Medina, Ohio, assignor to Rossborough Manufacturing Co., Cleveland, Ohio

Filed Oct. 3, 1974, Ser. No. 511,592

Int. Cl.² G01N *1/12*

U.S. Cl. 73—425.4 R **8 Claims**



1. A molten metal sampling device comprising:

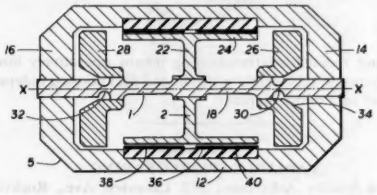
first wall means defining a mold chamber;
second wall means defining an inlet passage for conveying molten metal into said chamber; and,
valve means associated with said second wall means for closing said inlet passage in response to said second wall means reaching a predetermined temperature.

3,913,405

ANGULAR DIRECTION SENSOR

Bo H. G. Ljung, Wayne, and John C. Stiles, Morris Plains, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Aug. 16, 1974, Ser. No. 498,035
Int. Cl.[2] G01C *19/56*
U.S. Cl. 73—505 **9 Claims**



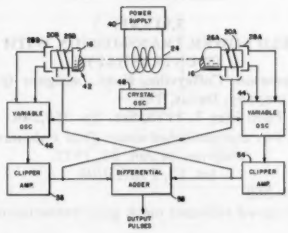
1. An angular direction sensor comprising a housing, an elastic a rod located to oscillate within said housing, said rod being supported at each end by a flexible connection within said housing comprising a pair of spaced necked down portions formed in said rod inwardly of the ends, a pair of spaced weight elements concentrically secured to said rod providing an inertial moment estabalishing the nodal points of oscillation exterior of said rod, means for exciting said rod to oscillate in a predefined plane, and pick-off means for providing a signal which varies as a function of the angular relationship of the plane of vibration with respect to the housing.

3,913,406

DIGITAL PULSE REBALANCE ACCELEROMETER

James V. Johnston, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 2, 1973, Ser. No. 385,210
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] G01P *15/08*
U.S. Cl. 73—516 R **2 Claims**



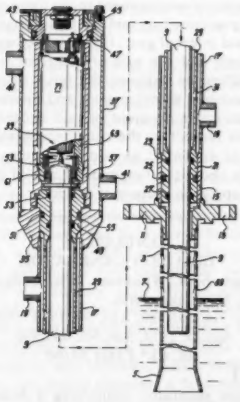
1. A digital pulse rebalance accelerometer for measuring acceleration of a body and comprising: a housing assembly having an elongated inner cylindrical chamber, a primary motor winding disposed around a portion of the inner wall of the chamber for developing a rotational electromagnetic field across said chamber, rotor means having a longitudinal axis coaxial with said chamber and disposed within said chamber for unencumbered rotation and translation, an air gap encompassing said rotor for isolating said rotor from surrounding housing structure, a hysteresis motor ring disposed around a central portion of said rotor and disposed within the plane of said rotational electromagnetic field for rotating said rotor, first and second split cup, capacitive, pick-offs encompassing respective first and second end portions of said rotor for responding to changes in capacitance at respective rotor ends, first and second torque coils adjacent respective pick-offs and disposed around the inner annular surface of the chamber encompassing a portion of said rotor for coupling electromagnetic energy to respective ends of said rotor, said rotor being constrained only by the hydrodynamic air gap and electromagnetic forces, said rotor ends having, respectively, a magnetic metal ring forming the terminal end portion for changing the capacitance of said split cups in response to longitudinal motion of the rotor and for providing motor restoration forces in response to electromagnetic energy coupled through said torque coils, a power supply for activating said primary motor winding and thereby imparting rotation to the rotor, differential means coupled to said first and second capacitance pick-off cups for providing differential output pulses in proportion to change in capacitance at the rotor ends indicative of changes in velocity of the housing assembly, a first oscillator and clipper amplifier serially connected between said first capacitive cups and said differential means, a second oscillator and clipper amplifier serially connected between said second capacitive cups and said differential means; and wherein said first clipper amplifier has an output coupled to said second torque coil for coupling electromagnetic energy thereto, and said second amplifier has an output coupled to said first torque coil for coupling energy pulses thereto.

3,913,407

DEVICE FOR ACOUSTIC DETECTION IN A NUCLEAR REACTOR

Michel Hanff, Bailly; Noel Lions, Manosqur, and Jean Peronnet, Aix-en-Provence, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed July 18, 1972, Ser. No. 272,879
Claims priority, application France, July 22, 1971, 71.26817
Int. Cl. G01h *3/00*
U.S. Cl. 73—552 **4 Claims**



1. A device for acoustic detection within the vessel of a nuclear reactor which is cooled by a circulating liquid, comprising a first acoustic conductor constituted by a tube having an open lower end and placed vertically in the liquid within the reactor vessel, a second acoustic conductor constituted by a solid rod extending to the exterior of the reactor vessel and mounted in the axis of the tube, an accelerometer assembly

which detects the signals delivered by the second conductor, said accelerometer assembly including an amplifying pressure needle carried by the upper extremity of the second conductor, a piezoelectric ceramic element, a block fitted with a spring for applying said ceramic element against said needle, a preamplifier connected to said ceramic element and a travel-limiting ring carried by the lower portion of the accelerometer surrounding said amplifying needle.

3,913,408

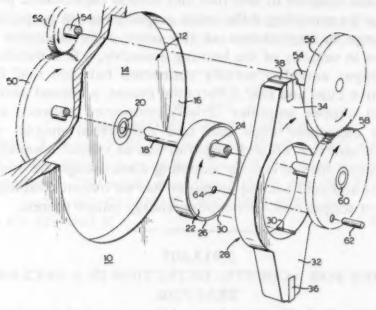
APPARATUS FOR CONTROLLING EPICYCLIC MOTION OF A ROTOR IN A ROTARY ENGINE

Barry Anthony Moore, Box 255, Malton Postal Station, Mississauga, Ontario, Canada

Filed Feb. 28, 1974, Ser. No. 446,631

Int. Cl.² F16H *37/12*; **F01C** *1/02*; **F16H** *1/28, 21/12*

U.S. Cl. 74—63 **5 Claims**



1. An apparatus for controlling epicyclic motion of a rotor rotating about an axis which moves in a circular path about a drive shaft, comprising an internal gear secured to a rotor with its axis coincident with the axis of the rotor; an eccentric being adapted to rotate within the rotor with its longitudinal axis being coincident with the axis of the rotor; a drive shaft extending through said eccentric with its axis parallel to the axis of the rotor and being permitted to rotate relative to said eccentric; an external gear secured to the drive shaft, the drive shaft being so positioned in said eccentric that said external gear engages said internal gear, the distance between the axis of the drive shaft and the axis of the rotor being equal to one-half the difference between the pitch diameters of said internal gear and said external gear; and means for synchronizing the rotational movement of said eccentric about the drive shaft with respect to the rotational movement of said rotor about said eccentric as said longitudinal axis of said eccentric orbits about the longitudinal axis of the drive shaft to control the epicyclic motion of the rotor.

3,913,409

VIBRATION GENERATOR

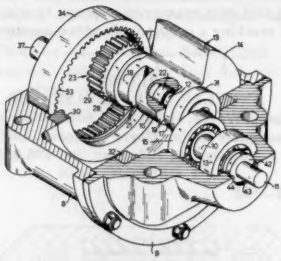
Rudolph G. Opderbeck, Waukesha, Wis., assignor to Wacker Corporation, Milwaukee, Wis.

Division of Ser. No. 355,580, Apr. 30, 1973. This application Apr. 3, 1974, Ser. No. 457,590

Int. Cl.² F16H *33/00*

U.S. Cl. 74—61 **3 Claims**

2. A vibration generator comprising a housing; a crank member having a journal portion mounted in an end wall of said housing for rotation on a horizontal axis and a crank pin within said housing spaced radially from the axis of said journal portion; a weight member eccentrically connected with said crank pin in rotatable relation thereto; an internal ring gear mounted in said housing coaxially with said journal portion of said crank member; peripheral load transmitting means securing said ring gear against rotation relative to said housing; a pinion non-rotatably connected with said weight member coaxially with said crank pin and in mesh with said ring



gear; and radial load transmitting means operatively interposed between said weight member and said housing independently of said crank member.

3,913,410

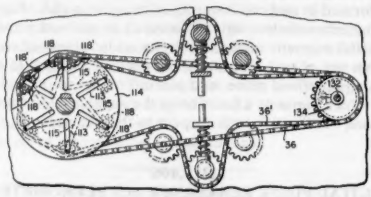
VARIABLE SPEED GEARING

Leonard Stanley Ackerman, 355 Lakeview Ave., Rockville Center, N.Y. 11570

Continuation-in-part of Ser. No. 416,621 abandoned. This application Sept. 11, 1974, Ser. No. 505,050

Int. Cl.² F16H *9/00, 55/52, 55/30*

U.S. Cl. 74—217 C **6 Claims**



5. A variable diameter sprocket for use in chain drive devices comprising a plurality of pairs of small sprockets each pair being mounted for simultaneous outward or inward radial movement with respect to the variable diameter sprocket, the sprockets of each said pair of sprockets being laterally offset from each other to be in parallel planes, and being operatively connected to provide opposite hand rotation of said small sprockets of each said pair.

3,913,411

MULTISPEED POWER TRANSMISSION WITH PLURAL COUNTERSHAFTS

James J. Jameson, Coffeyville, Kans., assignor to Gardner-Denver Company, Dallas, Tex.

Filed May 7, 1973, Ser. No. 358,244

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl. F16H *3/08*

U.S. Cl. 74—360 **6 Claims**

6. A multispeed constant mesh gear transmission comprising:

a housing;

an input shaft having an input gear mounted thereon;

a first countershaft having a first gear rotatably mounted thereon and in constant mesh with said input gear, and a first clutch for connecting said first gear for rotation with said first countershaft;

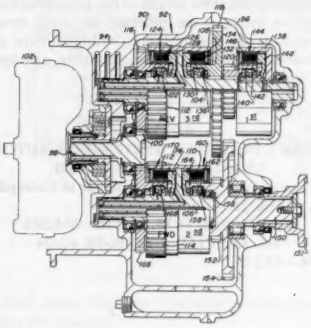
a second countershaft parallel to said first countershaft and having a second gear rotatably mounted thereon and in constant mesh with said input gear, and a second clutch

for connecting said second gear for rotation with said second countershaft;

third and fourth gears fixed respectively to said first and second countershafts and meshed one with the other;

a fifth gear mounted for rotation on said second countershaft and a third clutch for connecting said fifth gear to said second countershaft;

a sixth gear mounted for rotation on said first countershaft and a fourth clutch for connecting said sixth gear to said first countershaft, said sixth gear being in mesh with a seventh gear fixed for rotation with said fifth gear;



an eighth gear mounted for rotation on said second countershaft and a fifth clutch for connecting said eighth gear to said second countershaft;

a ninth gear mounted for rotation on said first countershaft and a sixth clutch for connecting said ninth gear to said first countershaft, said ninth gear being in mesh with a tenth gear fixed for rotation with said eighth gear; and,

an output shaft including first gear means fixed thereon and in mesh with said fifth gear and second gear means fixed on said output shaft and meshed with said eighth gear.

3,913,412

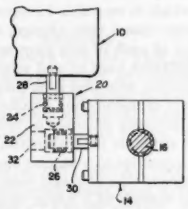
DRIVE COUPLING

John E. Hart, Dayton; William H. Penn, Jr., Lebanon, and John J. Tuss, Englewood, all of Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Filed Nov. 25, 1974, Ser. No. 526,777

Int. Cl.² F16H *1/18*

U.S. Cl. 74—424.8 R **8 Claims**



1. A drive coupling for connecting a first and a second member comprising:

a bearing block member;

a first drive member connected to said first member;

a second drive member connected to said second member;

said first and second drive members drivingly connected to said bearing block member by means of a sliding connection therebetween, whereby said first and second members are rigidly connected against relative movement in all directions except in the direction in which said drive members slidingly connected to said bearing block member.

3,913,413

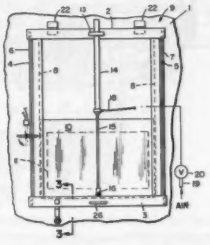
SAFETY GUARD STRUCTURE

Brooks Walker, 807 Francisco St., San Francisco, Calif. 94109

Filed May 6, 1974, Ser. No. 467,303

Int. Cl.² F16P *3/00*

U.S. Cl. 74—612 **3 Claims**



1. A safety guard structure adapted to be interposed between a mechanism and an operator horizontally spaced from said mechanism for protecting said operator, comprising:

a generally rectangular guard member,

a frame means guiding said guard member for movement from a lower working position with at least a portion of said member registering with a vertically extending area between said mechanism and said operator to an upper position spaced upwardly from said area, and

hinge means swingably supporting the upper end of said frame and having an axis of swing outwardly of said mechanism for swinging movement in a vertical plane for an operative position with said frame in working position to an operative position above and outwardly of said area.

3,913,414

DIFFERENTIAL STRUCTURE FOR PREVENTING LEAKAGE OF DIFFERENTIAL LOCK ACTUATING FLUID TO THE DIFFERENTIAL HOUSING

Thomas William Freiburger, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Sept. 29, 1972, Ser. No. 293,437

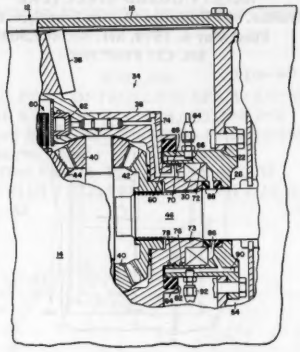
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F16H *1/38*

U.S. Cl. 74—710.5 **5 Claims**

1. In a combination including a fixed housing defining a fluid cavity in the lower portion thereof for holding an optimum level of fluid, drivable means rotatably mounted in said housing and including a portion which, during rotation, traces a path passing through the fluid cavity below the optimum level of fluid, a fluid manifold member being located in the housing and defining a first cylindrical mounting surface formed about a fixed axis, said drivable means including a second cylindrical mounting surface disposed in sliding engagement with said first cylindrical mounting surface and thus forming an interface between the drivable means and the manifold member, said drivable means further including a fluid pressure actuatable element, a fluid pressure inlet passage means being connected to the element and including first and second fluid passages located respectively in said drivable means and said manifold member and being joined in fluid communication at a location at said interface, and first and second sealing rings respectively located at the interface at the opposite sides of said location for preventing a substantial amount of the pressure fluid leakage which would occur along said interface in the absence of the sealing rings, the improvement comprising: zero-leak sealing means located for blocking

the flow of any fluid leaking past the first and second sealing rings from reaching the fluid-holding cavity of the housing; and drain passage means located in said manifold member and being in fluid communication with said interface at locations



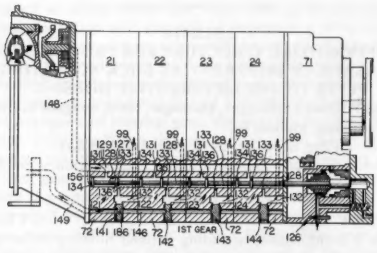
at the opposite sides of the sealing rings from the location at which said first and second fluid passages are in fluid communication with each other for draining fluid leaking past the first and second sealing rings.

3,913,415

CONTROL SYSTEM FOR MODULAR TRANSMISSION

Charles H. Herr, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 8, 1974, Ser. No. 458,998
Int. Cl.[2] F16H *3/74, 5/48, 37/02*
U.S. Cl. 74—752 C **15 Claims**



1. A power transmission including a plurality of sequentially arranged speed ratio modules, each of the modules comprising an input shaft,

an output shaft,

a planetary gear set having a sun gear, a ring gear and a plurality of planetary gears mounted upon a rotatable carrier and engaged with the ring gear and the sun gear, the input shaft being coupled for rotation with the ring gear and the output shaft being coupled with rotation with the carrier,

a direct drive clutch selectively operable to cause rotation of the ring gear together with the carrier,

a reduction brake selectively locking the sun gear against rotation, and

control means for operating both the direct drive clutch and reduction brake in response to a single hydraulic signal, the power transmission also including a control system comprising

a source of signal fluid under pressure,

conduit means for communicating the signal fluid to each of the speed ratio modules,

a separate valve means for selectively communicating the conduit means with the control means of the respective module, and

governor means operatively coupled with a final output drive shaft of the power transmission and each of the valves to condition the valves for sequentially communicating signal fluid to the respective modules relative to operating speed of the output shaft,

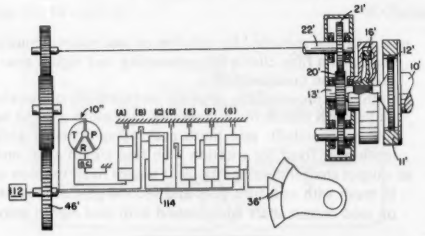
the plurality of separate valve means for the plurality of speed ratio modules each comprising a spool means of substantially the same length as the axial dimension of the respective module, the plurality of spool means being arranged in abutting relation within a bore extending continuously through the sequentially arranged speed ratio modules.

3,913,416

DOWNSHIFT INHIBITOR SYSTEM FOR AUTOMATIC TRANSMISSION CONTROL

Kenneth Frank Golan, Pekin, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 2, 1974, Ser. No. 494,301
Int. Cl.[2] F16H *3/74;* B60K *41/04*
U.S. Cl. 74—752 C **7 Claims**

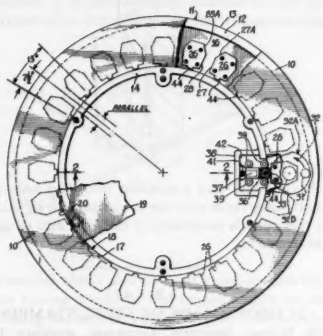


1. A hydraulic control system for a multiple speed ratio power transmission mechanism having a plurality of drive establishing means and an output member; said control system comprising a fluid pressure source; hydraulic governor means in fluid communication with said fluid pressure source and operably connected to said transmission output member for producing a plurality of hydraulic governor pressure signals that are functionally related in magnitude to the speed of said output member; a plurality of selector valves with valve members each of which is operable to automatically select and initiate a different speed ratio change; conduit structure for transmitting one of each of said governor pressure signals to a first end of different ones of said selector valves; means in fluid communication with said fluid pressure source for producing a plurality of distinct and smaller shift reference pressures than the pressure emanating from said fluid pressure source; conduit structure for transmitting one of each of said shift reference pressures to a second end of different ones of said selector valves; whereby said selector valves automatically initiate an upshift to a speed ratio resulting in higher speed for said output member when said governor pressure signals exceed said shift reference pressure values and automatically initiate a downshift to a speed ratio resulting in a lower speed for said output member when said shift reference pressure values exceed said governor pressure signals by a predetermined amount; means for delivering an operator established forced downshift pressure signal to a selector valve; and means on a selector valve member for preventing application of said forced downshift pressure signal thereto until the selector valve has moved to a position to automatically establish a downshift.

3,913,417
RING-SHAPED ROTARY INDEX PLATFORMS

William Vangor, 325 High Ridge Road, Fairfield, Conn. 06430

Filed July 22, 1974, Ser. No. 490,371
Int. Cl. B23b *29/32*
U.S. Cl. 74—822 12 Claims



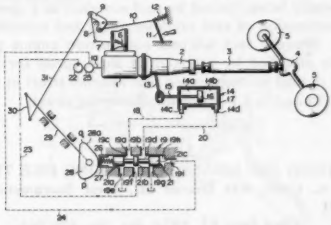
1. A rotary index platform assembly comprising
A. a support housing,
B. a planar platform rotatably mounted on the support housing for movement in its own plane about a rotation axis perpendicular to that plane,
C. a plurality of arrayed latching-indexing blocks extending from the platform, each having a protruding latching projection, and at least one substantially radially extending indexing surface intersecting the plane of the platform,
D. a resiliently-biassed latch on the support housing normally embracing the latching projection of one block, and movable to a disengaged position clear of said projections,
E. and a revolving unlatching-indexing cam rotatably mounted in the support housing adjacent to the latch and having a dwell sector oriented to move the latch to its disengaged position and a protruding drive roller positioned to engage said indexing surface for rotatable driving index movement of the platform, while the dwell sector maintains the latch in its disengaged position, over a sector of cam revolution dimensioned to move the latching projection of the next adjacent block into engageable alignment with the latch.

3,913,418
SYSTEM FOR CONTROLLING THE DRIVE AND DYNAMIC BRAKING OF AUTOMOBILES

Takayuki Miyao, and Toshimitsu Sakai, both of Toyota, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Filed Sept. 4, 1974, Ser. No. 503,159
Claims priority, application Japan, Sept. 5, 1973, 48-99891
Int. Cl.[2] B60K *41/16*
U.S. Cl. 74—856 5 Claims

1. A system for controlling the drive and dynamic braking of automobiles having a prime mover provided with an output shaft, a continuously variable drive ratio transmission coupled with the output shaft of the prime mover and a driven load, which comprises:
a. personally operable means; and
b. an automatic control line including
i. throttle means for controlling the supply of motive fluid to the prime mover,
ii. means for varying the drive ratio produced by the continuously variable drive ratio transmission,
iii. means for detecting the rotation speed of the prime mover, and
iv. a servo mechanism provided with a source of fluid pressure,
whereby the automatic control line maintains according to the movement of the personally operable means a predetermined

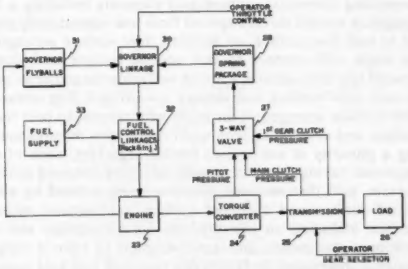


relationship between any two of the three factors: the throttle angle, speed and output torque of the prime mover, said predetermined relationship being so established that as the output power of the prime mover increases from a positive intermediate value relatively near zero, the prime mover speed rises in approximately direct proportion; as the output power of the prime mover decreases toward zero, the prime mover speed also advances; and as the prime mover absorbs a larger amount of power, the prime mover speed is rapidly elevated.

3,913,419
TORQUE LIMITING SYSTEM AND METHOD

Dwight B. Sale, Burlingame, and Terry R. Koelzer, San Bruno, both of Calif., assignors to Guy F. Atkinson Company, San Francisco, Calif.

Filed Nov. 1, 1972, Ser. No. 302,939
Int. Cl.[2] B60K *41/04*; F02D *31/00*; G05G *23/02*
U.S. Cl. 74—857 13 Claims



1. In apparatus for imparting momentum to a load, an internal combustion engine, a torque converter attached to said engine, drive train components including a transmission for selection of torque ratios to be delivered from said engine to said load, in combination with a torque limiting system comprising sensing means for providing a signal related to the torque converter output speed, a governor for limiting the speed of said engine, means actuated by the torque ratio selection for directing the torque converter output speed signal to the governor, said signal operating to modify the limit speed of said engine, whereby said governor limits engine speed to levels providing efficient operation and producing drive train torques which are within the stress limit capabilities of the drive train components.

2. In power operated apparatus for imparting momentum to a load through a drive train, an internal combustion engine, a

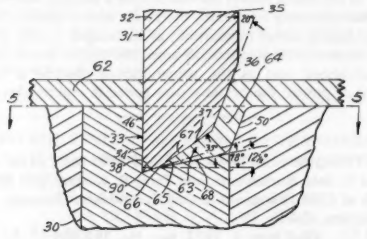
governor for controlling the speed of said internal combustion engine, a torque converter coupled to said internal combustion engine, an output shaft on said torque converter for coupling to the load, first means in said governor for limiting said internal combustion engine to a predetermined engine speed, means for generating an output signal related to the speed of said torque converter output shaft, second means in said governor for receiving said output signal and for limiting said internal combustion engine to an engine speed corresponding to said output signal, said internal combustion engine thereby being limited by said governor at a speed which is a combination of said predetermined and variable engine speeds, whereby said internal combustion engine governed speed is modified by said output shaft speed for metering change in load momentum so that internal stress in the drive train is limited to a level below damaging stress.

3,913,420

METHOD AND MEANS FOR MAKING FILE TEETH

James A. Coon, 929 Drever St., West Sacramento, Calif. 95691

Filed June 12, 1974, Ser. No. 478,766
Int. Cl.² B23D *73/00*; **B21D** *31/02*; **B21K** *21/00*; **B23D** *73/04*
U.S. Cl. 76—13 **4 Claims**



1. In an apparatus for making file teeth, a die set including a punch embodying a bar having a plurality of spaced apart depending elements, each of said elements including a first surface, a second surface spaced from and substantially parallel to said first surface, an inclined third surface arranged at an angle with respect to said second surface and sloping toward said first surface, a fourth surface arranged at an angle to said third surface and sloping toward said first surface, a fifth surface arranged at an angle with respect to said fourth surface and connecting with said first surface; an anvil including a plurality of contiguous similar segments, each of said segments having first and second matching recessed portions therein, said first recessed portions being defined by an inclined surface and a curved surface, said second recessed surface including an intermediate curved portion and end portions, said punch and anvil adapted to have a strip of material interposed therebetween punched into said recesses to form file teeth.

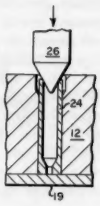
3,913,421

METHOD FOR INSTALLING A CAPILLARY INSERT IN A PASSAGE THROUGH A SPINNERET

Curtis Owen Hawkins, Cove City, N.C., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed June 5, 1974, Ser. No. 476,545
Int. Cl.² B21K *5/20*
U.S. Cl. 76—107 S **3 Claims**

1. A method for installing an insert in a passage connecting upper and lower surfaces of a spinneret plate, said passage having a single cylindrical length with an enlargement adjacent said upper surface, said method comprising: positioning the lower surface of said plate against a flat exterior supporting surface; placing an insert having a single outside diameter and a bore therethrough in said passage, said outside diameter being slightly less than the diameter of the passage to provide a sliding fit there between; sliding said insert against said flat supporting surface for vertical positioning in said passage, said



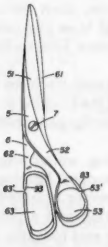
insert having one end extending into said enlargement the other end being flush with the lower surface of said plate; and sealing the outside periphery of said one end of said insert to said enlargement.

3,913,422

SCISSORS MADE OF STEEL STAMPINGS

Dietrich Weber, Solingen, Germany, assignor to Krusius Brothers, Solingen, Germany

Continuation of Ser. No. 290,228, Sept. 18, 1972, abandoned. This application July 17, 1974, Ser. No. 489,427
Claims priority, application Germany, Oct. 4, 1971, 2149429
Int. Cl.² B21K *11/06*
U.S. Cl. 76—104 A **11 Claims**



1. A method of making shears having a first and a second shear comprising the steps of:

A. cutting from steel sheet two integral parts each of substantially two arms-shape, the arms being disposed in an angle to one another, such that the first arm includes a cutting edge and a stem, and the second arm has a slight S-configuration and a strap projecting from the arms junction,

B. a. a first bending step for bending the second arm of each part along with the strap to form substantially a ring structure, the ends of the arm and strap substantially abutting,

b. a second bending step for bending said ring structure angularly out of its plane, and

C. joining the first and second shears by a shear pin traversing both shears.

3,913,423

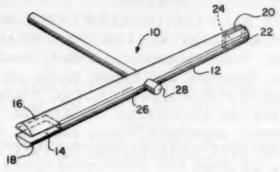
SPOT WELD REMOVER

Joseph J. Gerst, 8325 Belair Road, Baltimore, Md. 21236

Filed Nov. 7, 1974, Ser. No. 521,912
Int. Cl.³ B25B *13/48*
U.S. Cl. 81—3 R **2 Claims**

1. A spot weld remover for removing a spot welded strip of metal from a substrate to which spot welded, comprising: a

solid, straight elongate member of substantially uniform circular cross-section, having first and second ends, with a slot longitudinally in the first end for engaging a strip of sheet metal and winding same about said circular cross-section, said slot dividing said first end into equal substantially parallel fork members, and said elongate member having an aperture transversely therein passing therethrough midway the length of said elongate member, a handle slidably received in said aperture and freely removable therefrom for use in hammering-loose



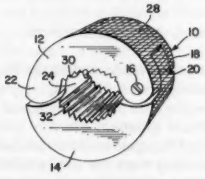
sheet metal wound about said circular cross-section the elongate member having a second slot longitudinally in said second end, dividing the second end into equal fork-members for engaging a strip of sheet metal and winding same about said circular cross-section, the fork members in the first end of the elongate member having a different spacing from the fork-members in the second end of the elongate member, and the plane of the slot in the first end of the elongate member being at right angles to the plane of the slot in the second end of the elongate member.

3,913,424

BOTTLE OPENER

Manuel Castillo, Chicago, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 30, 1974, Ser. No. 537,559
Int. Cl.² B67B 7/18
U.S. Cl. 81—3.44 **3 Claims**



1. Apparatus for opening a container having a threaded fastener thereon, which comprises: First and second arcuate opposed members, teeth carried on the inside surface of the opposed members, and pivot means engaging first ends of said members permit selective movement of said members about an axis parallel to the center of curvature of said arcuate members, said pivot means comprising a yoke on said first member engaging a lug on said member and a pin extending through the yoke and lug, said pin being disposed parallel to the center of the curvature of said jaws.

3,913,425

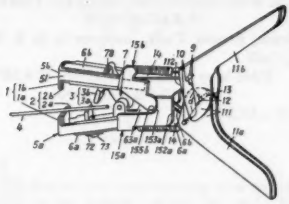
WIRE STRIPPER

Fritz Iff, Schauenbergstrasse 26, Zurich, Switzerland

Filed May 21, 1974, Ser. No. 471,887
Claims priority, application Switzerland, July 3, 1973, 9691/73
Int. Cl.² H02G 1/12
U.S. Cl. 81—9.5 A **13 Claims**

1. A wire stripper comprising, in combination:

a. a first pair of elongated frames, having ends pivotable towards and away from one another;
b. a first pair of jaws respectively mounted on the ends of said first frames for constraining an insulated wire therebetween;
c. a second pair of elongated frames having ends pivotable towards and away from one another;
d. a second pair of jaws respectively mounted on the ends of said second frames for making knotches in the insulation of the wire;



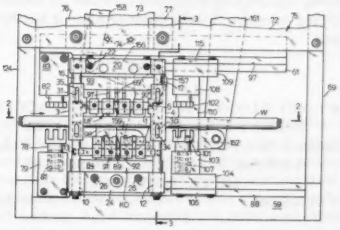
e. a severing device actuated by one of said pair of frames for severing the end of the wire, the second pair of jaws being located between the first pair of jaws and the severing device;
f. means for adjusting the spacing of the severing device from the second pair of jaws; and
g. means for increasing the spacing between the jaws of the first pair and the jaws of the second pair, during closure of the two pairs of jaws.

3,913,426

INSULATED WIRE CUTTING AND STRIPPING MECHANISM HAVING DOUBLE KNOCK-OUT MEANS FOR WASTE MATERIAL

Gerald E. Blaha, Waukesha, Wis., assignor to Artos Engineering Company, New Berlin, Wis.

Filed Dec. 23, 1974, Ser. No. 535,425
Int. Cl.² H02B 1/12
U.S. Cl. 81—9.51 **5 Claims**



1. An insulated wire cutting and stripping mechanism comprising a support frame, a stationary tool support and a reciprocable tool support, both supports operatively mounted on said frame and in opposed relation to each other; a pair of relatively opposed wire clamping jaws mounted, respectively, on said tool supports; a pair of relatively opposed wire and insulation cutting blade assemblies mounted, respectively, on said tool supports in laterally shiftable relation to said clamping jaws; a pair of relatively opposed cut wire gripping jaws mounted, respectively on said tool supports in laterally shiftable relation to said cutting blade assemblies, and cut insulation waste knock-out means operatively associated with both of the tool supports and opposed cutting blade assemblies for removing cut insulation waste material from their respective

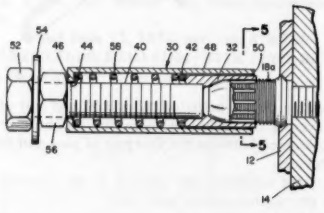
cutting blade assembly, said knock-out means comprising fingers mounted on their respective tool support for shifting relative to their respective blade assembly, and means connected between and for resiliently urging the fingers of said opposed knife assemblies away from one another, and said blade assemblies move relative to their respective fingers to thereby cause said fingers to remove cut insulation waste material from their blade assemblies.

3,913,427

TOOL FOR REMOVING BROKEN THREADED FASTENERS

George Brase, Fresno, Calif., assignor to B & R Tool, Inc., Fresno, Calif.

Filed May 30, 1974, Ser. No. 474,867
Int. Cl.² B25B *13/50*
U.S. Cl. 81—53.2 **18 Claims**



1. A tool for loosening a broken or worn threaded fastener within its socket in a structural member to facilitate removal therefrom comprising:

an elongated shaft having at least one threaded portion thereon;

a head member attached to an outer end of said shaft so as to transmit torque to it when said head member is turned;

a gripping member attached to an inner end of said shaft, said gripping member having an open ended, axially extending cavity and means on the inner walls of said cavity for gripping the threaded portion of a fastener to be loosened; and

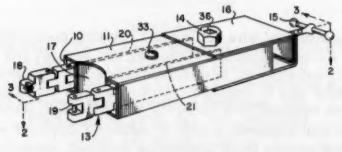
means engaging said threaded portion on said shaft and bearing against said structural member for removing said gripping member from a fastener after it has been loosened.

3,913,428

OFF-SET NUT RUNNER WITH OPEN-END ACCESS AND SOCKET-LIKE DRIVE CAPABILITY

Alton Brunson, Rte. No. 3, Box 702D, Mesquite, Tex. 75149

Filed Jan. 27, 1975, Ser. No. 544,216
Int. Cl.² B25B *13/00*
U.S. Cl. 81—57.43 **10 Claims**



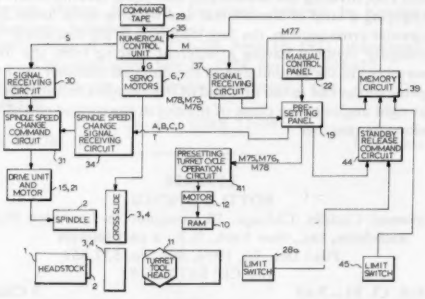
1. A nut driving tool with lateral offset drive capability comprising, a body housing; a drive belt means comprised of contiguous flat-surfaced links; belt driving means comprising a driving member rotatable with respect to said body housing, and formed with a plurality of contiguous flat edge faces; said drive belt means being carried around said driving member and extending in loop fashion externally of one end of said body housing; a concave arcuate tension plate means affixed to said body housing at said one end thereof, with said drive belt extending between transverse extremes of said tension plate means and respective side walls of said body housing; means for selectively translating said driving member to establish the longitudinal displacement between said tension plate means and said driving member; and means external of said body housing and communicating with said driving means by which rotary motion may be imparted to said driving member.

3,913,429

NUMERICALLY-CONTROLLED LATHE WITH PROGRAM-CONTROLLED TOOL HEAD

Yoshiro Uchida; Yutaka Matsumura; Tadashi Nonaka; Kinya Hirota; Jiro Takashita, and Hisashi Ishida, all of Abiko, Japan, assignors to Hitachi Seiki Co., Ltd., Tokyo, Japan

Filed Jan. 24, 1974, Ser. No. 436,374
Claims priority, application Japan, Feb. 10, 1973, 48-16101; Feb. 10, 1973, 48-16102; Feb. 10, 1973, 48-16103; Feb. 10, 1973, 48-16104
Int. Cl.² B23B *3/00;* **B23Q** *39/00*
U.S. Cl. 82—2 B **7 Claims**



1. In a machine tool, the combination of:

a bed;

a headstock positioned on one end of the bed and having a spindle for rotating a workpiece;

a slide slidable on the bed parallel with and also at a right angle to the axis of said spindle;

at least one first tool head mounted on said slide and having a plurality of cutting tools for use in cutting the outside or inside diameters of a work-piece mounted on the spindle;

a movable head located on said bed and spaced from said slide in the opposite direction from said headstock and movable parallel with the axis of the spindle;

a second tool head mounted on said movable head and having at least one cutting tool thereon for use in cutting the outside diameter or inside diameter of said workpiece;

a servo motor coupled to said slide for driving said slide;

a drive motor coupled to said movable head for driving the movable head;

an instruction tape which contains machining command information for the first tool head and auxiliary command information for the first tool head and the second tool head;

a program control unit coupled to said drive motor for controlling said drive motor with machining command information and including a presetting panel which permits prior selection and presetting of the machining command information for the first tool head and auxiliary command information for the first tool head and the second tool head; and

a numerical control unit coupled to said servo motor and said presetting panel receiving information from said instruction tape for controlling said servo motor with the machining command information and the auxiliary command information related to the first tool head and generating auxiliary command information for the second tool head and supplying it to the presetting panel, said program control unit further controlling said drive motor with the auxiliary command information for said second tool head and generating auxiliary command information for the first tool head and generating auxiliary command information for the first tool head and supplying it to the numerical control unit.

3,913,430
DEVICE FOR CUTTING RINGS FROM A HOLLOW, THIN-WALLED AND ELONGATE CYLINDRICAL OBJECT

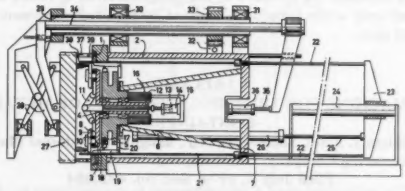
Cornelis Dionysius van Dijk, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 26, 1974, Ser. No. 509,470

Claims priority, application Netherlands, Oct. 3, 1973, 7313574

Int. Cl.² B23D *21/04*

U.S. Cl. 82—82 **3 Claims**



1. A device for cutting rings from a hollow, thin-walled and elongate cylindrical object, comprising a frame, an annular die arranged in the frame, and having a cutting edge, a shaft connected to the frame at a distance from said die and coaxially with respect to the die, a cutting head journalled to be rotatable on the shaft, a number of slides, a corresponding number of cutting rollers each having a cutting edge, the cutting head supporting said cutting rollers, each of which is journalled to be rotatable with axial play in a respective slide, each slide being radially movable in the cutting head, the cutting edge of the said cutting rollers cooperating with a cutting edge of the die, spring means for biasing a cutting roller away from the die cutting edge, means for accommodating the cylindrical object within the frame and for sliding the object along the die, a guide having means for bearing on a side of the die and means for guiding said rollers, the guide being positioned such that a desired cutting clearance is obtained between the cutting edge of the cutting rollers and the die.

3,913,431
CUTTING MACHINE FOR FRICTION MATERIAL

Arthur Harold Lambert, 37 Parkland Crescent, Whangarei, New Zealand

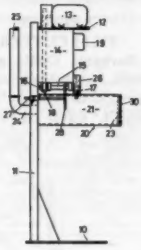
Filed Feb. 8, 1974, Ser. No. 440,817

Claims priority, application New Zealand, Feb. 9, 1974, 169765

Int. Cl.² B26D *5/02*; B27G *19/02*

U.S. Cl. 83—100 **4 Claims**

1. A cutting machine comprising a stand which includes a vertical upright member, a driven circular saw blade mounted on said stand, a hollow cutting table in the form of tube which extends horizontally from said upright member, a slot formed in the upper surface of the tube within which a portion of the cutting edge of the saw blade is received, an outlet at the end of the tube adjacent the upright member which is in communication with the interior of the tube, extractor means connected to the said outlet, an end plate on the outer end of the



tube which includes at least one opening, and a pivotal cover plate mounted concentrically on the end plate, said cover plate having an opening or openings which correspond to the opening or openings of the said end plate.

3,913,432
GAP CUTTING APPARATUS FOR SLIDE FASTENER CHAIN

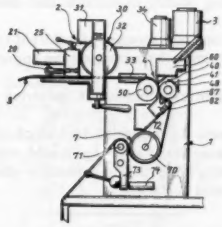
Kurt Thaler, and Alfred Neugebauer, both of Stuttgart, Germany, assignors to Dr.-Ing. Josef Ruhrmann, Stuttgart, Germany

Filed Sept. 3, 1974, Ser. No. 502,448

Claims priority, application Germany, Sept. 7, 1973, 2345204

Int. Cl.³ B26D *7/06*; B23P *19/04*; A41H *37/06*

U.S. Cl. 83—121 **12 Claims**



1. Apparatus for cutting a gap in two continuous rows of interlocked slide fastener elements respectively supported on two carriers, said carriers and said elements constituting an elongated slide fastener chain, said rows consisting of respective continuous filaments, each element of each row having an enlarged locking head engaging an associated head of an element of the other row and constituting therewith a pair of associated heads, first pairs of said locking heads alternating with second pairs of said locking heads in the direction of elongation of said slide fastener chain, said apparatus comprising:

a. a cutting station; and

b. conveying means for longitudinally moving said chain through said station, said cutting station including

1. a cutting wheel mounted for rotation about an axis and having a circumferential face portion formed with circumferentially spaced recesses, said recesses defining lands of said face portion therebetween, each recess being open in a radially outward direction and having two branches open in opposite axial directions; and

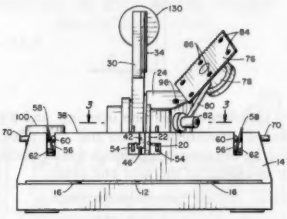
2. backing means for introducing a first pair of said locking heads into each of said recesses while introducing

portions of said filaments connecting the heads of said first pairs with the heads of said second pairs into said branches, and for cutting said portions during movement of said chain through said station, whereby said second pairs of heads are separated from said carriers.

3,913,433
FILM CUTTER

George Matthews, Burbank, Calif., assignor to Magnasync Moviola Corporation, North Hollywood, Calif.

Filed June 19, 1974, Ser. No. 480,993
Int. Cl.² B26D 1/30, 7/16
U.S. Cl. 83—157 **6 Claims**



1. A film cutter for use in cutting motion picture film comprising:

a base;

a stationary shear secured to said base;

a movable shear movably mounted on said base and cooperable with said stationary shear to shear a film positioned therebetween;

a plurality of film support blocks having a surface for supporting a strip of film during shearing, each being adapted to accommodate a different style of film;

and each being readily mountable and demountable from said base;

whereby any one of a number of different types of film may be sheared simply by mounting the appropriate block on said base;

recess means in said block for receiving said stationary shear;

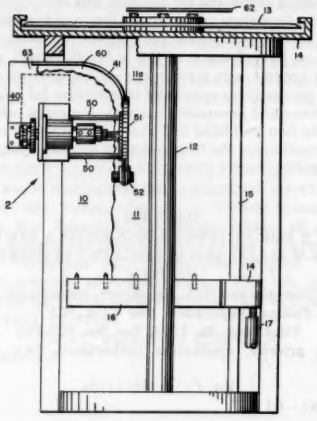
mounting means for mounting said block to said base with said stationary shear residing in said recess means, and with a cutting edge of said stationary shear substantially flush with said surface.

3,913,434
MACHINE FOR TRIMMING AND SLICING BACON SLABS

James P. Smithers, Glen Ellyn, Ill., assignor to Armour and Company, Phoenix, Ariz.

Filed Oct. 5, 1973, Ser. No. 403,940
Int. Cl.² B26D 7/06
U.S. Cl. 83—163 **8 Claims**

1. A machine for trimming and slicing a bacon slab comprising a blade for cutting said bacon slab into slices, a bed for supporting said slab, means for pushing said slab along said bed in a forward direction toward said blade, and a device secured to said bed for trimming a side edge of said slab as it is pushed toward said blade, said device including a shaft which is transverse to said direction, a circular blade attached to said shaft, said circular blade being located inward of the outermost side edge portions of said slab, and means for rotating said shaft whereby said circular blade is effective to trim off a side edge portion of said slab as the slab is pushed forwardly toward said slicing blade, said means being effective to rotate said shaft in a direction such that its periphery where it contacts the slab moves in the same direction as said slab is being pushed whereby the movement of the slab toward the slicing blade tends to assist rather than resist the rotation of said circular blade, said means including a fluid driven motor

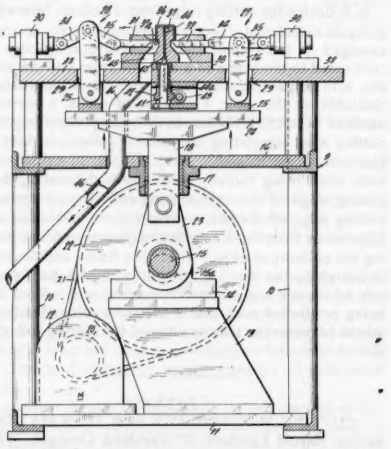


and in which the pressure of the fluid is such as to rotate said shaft only when rotation is assisted by forward movement of said slab.

3,913,435
MACHINE FOR TRIMMING THE EDGES OF METAL CONTAINERS

William J. Stahl, Somerville, N.J., assignor to National Manufacturing Company, Chatham, N.J.

Filed July 5, 1974, Ser. No. 485,884
Int. Cl.² B23D 21/14
U.S. Cl. 83—193 **1 Claim**



1. A machine for trimming the open ends of containers comprising:

a. a mandrel to receive and support a container in a trimming position, said mandrel formed with a shearing edge spaced from the open end of the container;

b. a plurality of cutting blades around the mandrel and normal thereto;

c. a toggle linkage freely coupled at one end to each of said cutting blades;

d. a source of reciprocal power comprising a motor, a first pulley on said motor, a second pulley drivably coupled to

the first pulley, a shaft for said second pulley and an eccentric carried by the said shaft;

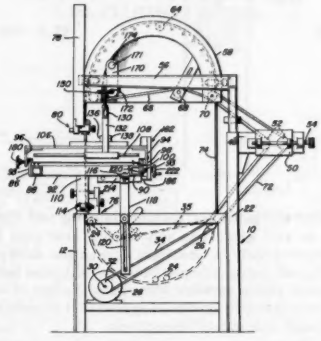
e. a plate secured to said reciprocal power sources;

f. link members of selective length to couple the said plate to the toggle linkages whereby the cutting blades are alternately moved into and out of cutting positions in a desired sequence.

3,913,436
BAND SAW MACHINE

Michael Orescan, Box 458, Harriston, Ontario, Canada (NOG ZO)

Filed Jan. 7, 1974, Ser. No. 431,485
Int. Cl.² B26D 1/46
U.S. Cl. 83—409 **5 Claims**



1. In combination, a saw including a base relative to which an elongated upstanding saw blade portion is longitudinally movable, a workpiece support table supported from said base, said support table including a base portion supported from said base for stationary angular adjustment about a generally horizontal axis extending transversely of the upstanding plane in which said blade portion is disposed and a table top supported from said base portion for guided shifting relative to said base portion along a path fixed relative to said base portion, disposed in said plane and angularly displaceable with said base portion relative to said base, said table top being supported from said base portion for guided gravity movement downwardly along said path, when the latter is inclined, and clamp means supported from said top for movement toward and away from the latter, said clamp means including a supportive holddown structure therefor mounted from said table top for adjustable shifting transversely of said path and substantially normal to said plane and having a mounting portion thereof spaced above said table top and relative to which said clamp means is adjustably shiftable toward and away from said table top.

3,913,437
LOWER GUARD ASSEMBLY FOR POWER SAW

Howard David Speer, Sykesville, Md., and Burton Elwood Gerke, Jr., Stewartstown, Pa., assignors to The Black and Decker Manufacturing Company, Towson, Md.

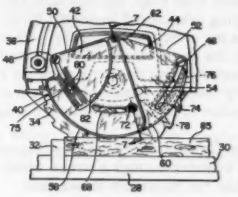
Filed Feb. 11, 1974, Ser. No. 441,405
Int. Cl.² B26D 7/22
U.S. Cl. 83—478 **10 Claims**

1. A lower guard assembly for a power saw including a rotary saw blade, comprising:

first and second guard members located adjacent to the saw blade and mounted for pivotal movement about first and second spaced pivot points, respectively, each guard member having an inner edge and a curved marginal edge;

said guard members normally overlapping each other along said inner edges with said curved marginal edges adjacent the lower periphery of the saw blade;

means for slidably connecting said first and second guard members together to permit said guard members to pivot simultaneously in opposite directions about said first and second pivot points upon movement of a workpiece into



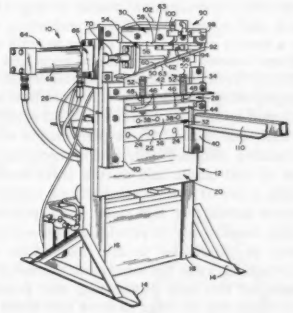
engagement with either curved marginal edge of said guard members; and

means for slidably connecting said second guard member to said second pivot point to permit said first and second guard members to pivot as a unit about said first pivot point upon movement of a workpiece into engagement with said inner edge of said second guard member.

3,913,438
WEDGE ACTUATED CUTTING AND/OR FORMING TOOLS

Andrew C. Walters, Dallas, and William M. Goss, Richardson, both of Tex., assignors to Fabco, Incorporated, Lewisville, Tex.

Division of Ser. No. 331,237, Feb. 9, 1973. This application July 15, 1974, Ser. No. 488,790
Int. Cl.² B26D 5/12; B30B 1/26
U.S. Cl. 83—529 **4 Claims**



1. A shear comprising:

a generally upright frame including a pair of vertically extending guide portions and a base including a hydraulic reservoir filled with a substantial quantity of hydraulic fluid, whereby the hydraulic reservoir and the hydraulic fluid therein tend to stabilize the shear and tend to absorb vibrations caused by the operation thereof;

a fixed platen extending between the lower ends of the guide portions of the frame and supporting a first cutting blade;

a movable platen slidably supported on the guide portions of the frame and supporting a second cutting blade;

a backup extending between the upper ends of the guide portions of the frame;

a wedge mounted between the backup and the movable platen for lateral reciprocation with respect thereto;

said wedge and movable platen including cooperating camming surfaces whereby lateral reciprocation of the wedge causes vertical reciprocation of the movable platen toward and away from the fixed platen;

a hydraulic cylinder mounted on the frame and operatively connected to the wedge, said hydraulic cylinder having a predetermined maximum stroke;

hydraulic pump means mounted on the frame for withdrawing hydraulic fluid from the hydraulic fluid reservoir and for supplying pressurized hydraulic fluid;

valve means for selectively directing pressurized hydraulic fluid from the pump means to the hydraulic cylinder and thereby reciprocating the wedge and the movable platen;

reinforcing members mounted on the frame for preventing separation of the cutting blades during reciprocation thereof;

switch means for controlling the valve means to actuate the hydraulic cylinder through a stroke which is substantially shorter than the maximum stroke; and

means mounted on the wedge for reciprocation therewith for actuating the switch means and thereby controlling the stroke of the hydraulic cylinder, the wedge and the movable platen.

3,913,439

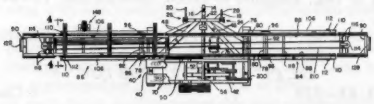
PORTABLE SAWMILL

Arthur Large, R.R. No. 5, North Vernon, Ind. 47265

Filed Oct. 30, 1974, Ser. No. 519,351

Int. Cl.² B26D *7/06;* **B27B** *5/10, 7/00*

U.S. Cl. 83—707 **13 Claims**



1. For use with a conventional tractor having, at its rear, a 3-point hitch and power take-off shaft extending rearwardly therefrom, a tractor mounted and driven sawmill comprising a central frame adapted to be mounted upon and raised and lowered by said 3-point hitch, said central frame having leg means engaging the ground in its lowered position, a saw blade journal mounted upon said central frame for rotation about a transverse axis, said central frame providing a central track portion extending longitudinally and perpendicular to said journal axis of said blade, said central track portion having opposite ends, a pair of outer track portions, means for rigidly and releasably connecting said outer track portions to said opposite ends, respectively, to provide a three-section rectilinear trackway perpendicular to said blade axis, a carriage mounted on said trackway for movement therealong past said blade, means for drivingly connecting said power take-off shaft to said blade and carriage to drive said blade about said axis and to reciprocate said carriage along said trackway, and means for mounting pieces of timber on said carriage for movement therewith past said blade, said sawmill having a collapsed condition with said outer track portions disconnected from said central track portion for movement by said tractor.

3,913,440

GUIDE DEVICE FOR POWER SAW AND THE LIKE

Richard D. Baker, 3376 McLaughlin Ave., Los Angeles, Calif. 90066

Filed Nov. 29, 1974, Ser. No. 528,452

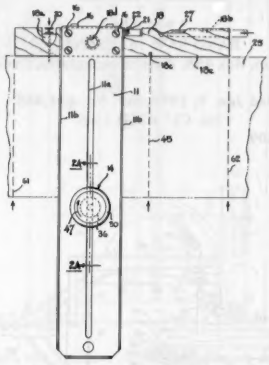
Int. Cl.² B23D *51/02*

U.S. Cl. 83—745 **10 Claims**

1. A guide device for guiding a power tool along a workpiece comprising:

a guide bar having a longitudinal slot formed therein and at least one edge for guiding the tool along the workpiece, a cross bar member attached to the guide bar, and

an adjustable clamp member supported on said guide bar in the longitudinal slot thereof for clamping the guide device to the workpiece, said clamp member including resilient post means and means for compressing said post means



against said guide bar, thereby clamping said clamp member to said guide bar and causing said post means to expand radially in abutment against the workpiece, the workpiece being clamped between said cross bar member and said clamp member with opposite edges of said workpiece in clamped abutment against said cross bar member and said post means respectively.

3,913,441

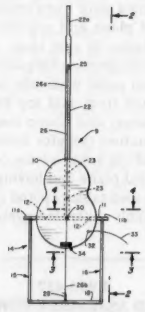
MUSICAL INSTRUMENT

Doyle Manor, 12219 McClennan, Granada Hills, Calif. 91344

Filed Feb. 18, 1975, Ser. No. 550,636

Int. Cl.² G10D *1/00;* **G10G** *5/00;* **G10H** *3/00*

U.S. Cl. 84—1.16 **4 Claims**



1. A musical instrument comprising:

a base and an arm extending upwardly from the top edge of the base;

a handle at the upper end of said arm;

a substantially horizontal cross member connected to said base and extending to opposites sides of said base;

a stand for rotatably supporting said cross member at opposite sides of said base to provide for rotation of said base and said handle about the axis of said cross member;

a first hook connected to an upper portion of said arm and a second hook connected to a portion of said stand below said base;

a string connected at opposite ends to said hooks and passing over said arm and said base;

guide means located at the lower portion of said base for maintaining said string in alignment between said two hooks and at a desired height above said base; and

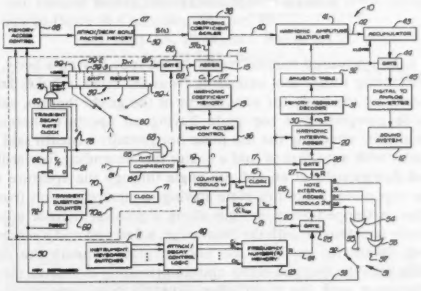
pickup means located in said base underneath said string and connected with an output at the side of said base;

said guide means fixing the height of said string above said pickup means in order to reproduce the various tones produced by vibration of said string under varying tension determined by the angular position of said handle.

3,913,442
VOICING FOR A COMPUTOR ORGAN

Ralph Deutsch, Sherman Oaks, Calif., assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed May 16, 1974, Ser. No. 470,628
Int. Cl.² G10H *1/02, 5/00*
U.S. Cl. 84—1.19 **26 Claims**



1. In a musical instrument of the type including generation means for computing in real time the amplitudes at successive sample points of a musical waveshape, and a converter for converting said waveshape amplitudes to musical signals as the computations are carried out, said generation means including circuitry for individually calculating the constituent Fourier components of that musical waveshape and an accumulator for summing these Fourier components to obtain each waveshape amplitude, the relative amplitudes of said Fourier components with respect to each other being established by a set of harmonic coefficients, the improvement comprising;

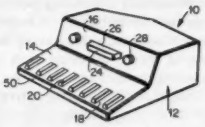
means for adding to one of said harmonic coefficients a single binary word consisting of all binary 0's and a single binary 1-bit to produce a transient voice having a relative amplitude established by the position of said single 1-bit within said word, said transient voice having a substantially sinusoidal waveshape.

3,913,443
MUSICAL RECORDING AND METHOD AND APPARATUS THEREFOR

Aaron R. Jewett, 669 Merrimon Ave., Asheville, N.C. 28804

Continuation-in-part of Ser. No. 158,221, June 30, 1971, abandoned. This application June 26, 1972, Ser. No. 266,378
Int. Cl.² G10H *3/08*
U.S. Cl. 84—1.28 **9 Claims**

1. Apparatus for reproducing chordal tones of complementary musical instruments, comprising a continuous-band, multiple-track magnetic recording tape and cartridge housing therefore, each of said tape tracks having recorded thereon, continuous throughout the length of each track, different chordal tones of said musical instruments in the same key, said

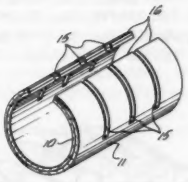


chordal tones being synchronized to simulate background music with no discontinuity when selectively reproduced.

3,913,444
THERMALLY DEFORMABLE FASTENING PIN

Richard F. Otte, Los Angeles, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Nov. 8, 1972, Ser. No. 304,821
Int. Cl.² F16B *21/14*
U.S. Cl. 85—8.3 **10 Claims**

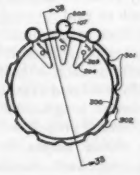


10. The pin of claim 1 wherein said slits are at least partially aligned.

3,913,445
AMMUNITION AND WEAPON SYSTEMS

Andrew J. Grandy, 2707 Grant Ave., North Hills, Pa. 19038

Division of Ser. No. 239,595, Mar. 30, 1972, Pat. No. 3,857,339. This application Nov. 2, 1973, Ser. No. 412,063
Int. Cl.² F42B *39/08*
U.S. Cl. 89—35 R **23 Claims**



1. A cluster of ammunition capsules comprising,

a plurality of ammunition capsules each provided with an elongated longitudinally extending cylindrical chamber having a forward barrel portion for slidaby receiving a corresponding projectile and a pressure chamber portion aligned with and rearward of its barrel portion, adjacent

ones of said ammunition capsules being integrally connected,

a respective propellant capsule chamber integral with and laterally offset from each corresponding elongated chamber, each of said forward barrel portions being laterally spaced from longitudinally extending portions of its corresponding propellant chamber by a respective capsule wall portion, each of said capsules having means defining a forwardly opening recess between each barrel portion and its corresponding propellant chamber, each of said recess defining means including respective capsule portions of each of its corresponding cylindrical chamber, porpellant chamber and capsule wall portion, each of said propellant chambers having a closed forward end extending across and integral with the forwardmost longitudinally extending portions of the corresponding propellant chamber,

each of said capsules having metering orifice means for fluidly communicating each capsule propellant chamber with its corresponding pressure chamber, each of said metering orifice means being partially defined by its corresponding capsule wall portion, and

a primer carried by each of said ammunition capsules for igniting respective capsule propellant charges.

3,913,446

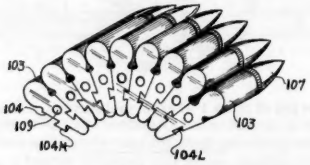
AMMUNITION AND WEAPON SYSTEMS

Andrew J. Grandy, 2707 Grant Ave., North Hills, Pa. 19038

Division of Ser. No. 239,595, Mar. 30, 1972, Pat. No. 3,857,339. This application Dec. 19, 1973, Ser. No. 426,272

Int. Cl.² F42B *39/08*

U.S. Cl. 89—35 A **21 Claims**



1. A cluster of ammunition capsules comprising,

a plurality of ammunition capsules each provided with an elongated cylindrical chamber having a forward barrel portion for slidably receiving a corresponding projectile and a pressure chamber portion aligned with and rearward of its barrel portion,

a respective propellant capsule chamber integral with and laterally offset from each corresponding elongated chamber, each of said forward barrel portions being laterally spaced from longitudinally extending portions of its corresponding propellant chamber by a respective capsule wall portion, each of said propellant chambers having a closed forward end extending across and integral with the forwardmost longitudinally extending portions of the corresponding propellant chamber,

metering orifice means for fluidly communicating each capsule propellant chamber with its corresponding pressure chamber,

a primer carried by each of said ammunition capsules for igniting respective capsule propellant charges,

each propellant capsule chamber having opposed longtiduinally extending wall portions, corresponding ones of said wall portions each having a longitudinally extending groove and the corresponding other wall portions each having a tongue protuberance of a substantially similar configuration as its respective groove, and

successive ones of said ammunition capsules being connected with mating tongue in groove securement between adjacent propellant capsule chambers, said groove and tongue of each propellant chamber have corresponding planar surface portions that extend in respective non-parallel planes, the tongue of at least one propellant chamber substantially filling the groove of an adjacent capsule.

3,913,447

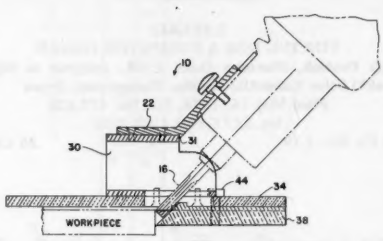
ROUTER MITERING-GUIDE

Edward Noland Roche, 5 Hickory Hill Road, Cockeysville, Md. 21030

Filed Oct. 8, 1974, Ser. No. 513,121

Int. Cl.² B23C *1/20*; B27C *5/10*

U.S. Cl. 90—12 D **9 Claims**



1. In a powered manual router of the type having a body, a sidecutting rotary tool extending from the body, a guide and means on the body for attachment of the guide thereto, said guide comprising: a top plate having an aperture therein, means for attaching the top plate horizontally beneath said a router with a portion of said a router tool extending forwardly and downwardly at an oblique angle through the aperture in the top plate, a bottom plate having: a square-section front edge, a stepped-down margin along a portion thereof adjacently coextensive with the front edge, a first end and a second end; means for securing the bottom plate beneath the top plate with the stepped-down margin providing clearance threrebetween with the front edge centrally transverse to said router tool and the plane of the front edge substantially aligned with the forward-most extension of the router tool; and means for laterally relocating and for resecuring the bottom plate relative to the top plate in a direction parallel with the plane of said front edge to respective alternate positions placing either the first or the second end of the bottom plate, as desired, in coincidence with the position of a portion of said a router tool.

3,913,448

HYDRAULIC ACTUATOR

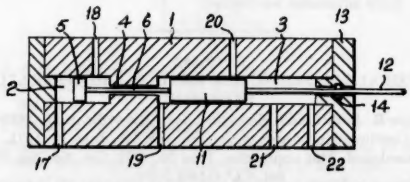
Terence Patrick Priestley, Gotham, and John Duncan Garside, Loughborough, both of England, assignors to The Loughborough University of Technology, Loughborough, England

Filed July 31, 1972, Ser. No. 276,369

Claims priority, application United Kingdom, Aug. 4, 1971, 36572/71

Int. Cl.² F15B *21/02*

U.S. Cl. 91—36 **9 Claims**



1. A hydraulic actuator comprising a first cylinder containing a first double-acting piston, first and second ports each adjacent a different end of said first cylinder and piston-controlled port means intermediate the ends of said first cylinder opened and closed by said first piston in moving between the

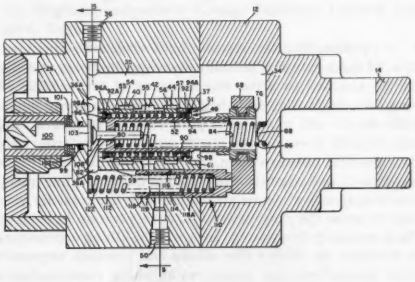
ends of said first cylinder, said first and second ports being connected to first and second sequential valve portion controlled ports in a housing independent of the actuator and respectively controlling connection of said first and second ports in a predetermined sequence to a source of pressurized hydraulic medium and to exhaust, said piston-controlled port means including a first piston-controlled port connected to a third sequential valve portion controlled port in said housing, a second cylinder aligned end-to-end with said first cylinder and containing a second piston, a probe slidable relative to the cylinders and extending from the first cylinder to the second cylinder to prevent the two pistons moving closer to one another than a predetermined minimum, said second cylinder having a third port connected to a fourth sequential valve portion controlled port, and coupling means in said housing connecting said first, second, third and fourth valve portions to insure operation of each valve portion in timed relationship with the other three valve portions.

3,913,449

POSITION-RESPONSIVE HYDRAULIC CYLINDER

James Allan Koch, Hudson; Roger John Nelson, Cedar Falls, and Donald LeRoy Henderson, Waterloo, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 15, 1974, Ser. No. 470,133
Int. Cl.² F15B *9/10*
U.S. Cl. 91—368 **22 Claims**



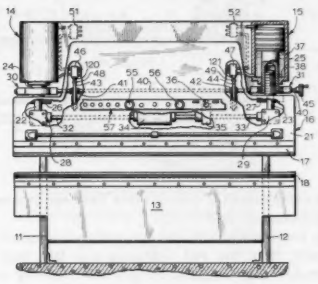
1. A position-responsive hydraulic cylinder for use in a hydraulic system including a source of fluid pressure and a fluid reservoir, said hydraulic cylinder comprising: a cylinder body having a longitudinal bore; a piston and rod assembly slidably mounted in the bore to form an expandable pressure chamber therewith, and extending from one end of the cylinder body; valving means mounted in the cylinder body at the end thereof opposite from the one end and movable to either side of a neutral position to selectively connect the chamber with the source or reservoir; selector means operatively associated with the valving means to effect the position thereof; float valving means slidable within the cylinder body and interposed between the source and the valving means and positionable by the selector means to disconnect the source and connect the reservoir to the valve means; feedback means operatively associated with the valving means and the piston and rod assembly responsive to movement of the piston and rod assembly to a position selected by the position of the selector means to move the valving means to the neutral position; the feedback means including a member having a threaded engagement with the piston and rod assembly rotatable upon movement of the piston and rod assembly and connected to the valving means to move the valving means to a neutral position upon rotation.

3,913,450

HYDRAULIC CONTROL SYSTEM FOR PRESS BRAKES OR THE LIKE

Robert MacGregor, Blue Island, Ill., assignor to Dreis & Krump Manufacturing Co., Chicago, Ill.

Filed May 11, 1973, Ser. No. 359,220
Int. Cl.² F15B *13/16, 15/22, 13/06*
U.S. Cl. 91—390 **6 Claims**



1. In a hydraulic press brake of the type having a frame, a bed, and a ram disposed to reciprocate on said frame above said bed, an actuator and control system for establishing a top travel limit for said ram comprising, in combination:

a pair of hydraulic cylinders, each having a housing defining a vertical chamber, a piston slidably disposed to vertically reciprocate within said chamber, and top and bottom ports for admitting hydraulic fluid above and below said piston;

means for suspending said ram from said pistons to cause said ram to reciprocate therewith;

means including a hydraulic pump and reservoir for supplying hydraulic fluid under pressure;

means including a pair of hydraulic valves having a mechanical actuator stem for directing hydraulic fluid from said pump to said bottom ports of respective ones of said hydraulic cylinders, the pressure of the fluid so directed being dependent on the position of said actuator stem;

ram height adjustment means including a pair of valve actuator members on said ram for actuating said mechanical valve stems as said ram reaches its top travel limit. thereby modulating the pressure admitted to the bottom ports of said hydraulic cylinders to maintain said ram in said top limit position; and

means for simultaneously adjusting the vertical positions of said valve actuator members relative to said ram to select the top limit position of said ram.

3,913,451

HYDRAULIC CYLINDER WITH CUSHIONING MEANS

David Ian McDonald, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Aug. 30, 1974, Ser. No. 502,021
Int. Cl.² F15B *15/22;* **F16J** *15/18*
U.S. Cl. 91—396 **5 Claims**

1. A hydraulic piston and cylinder having a cushioning means at one end thereof comprising the combination of

a hydraulic cylinder with a head at one end having a port for flow of liquid into and from said cylinder;

a rod extending axially of said cylinder and through said head;

a piston fixedly mounted on said rod and reciprocable in said cylinder

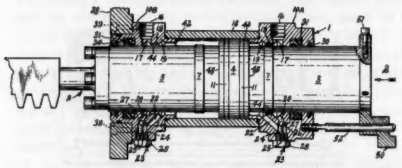
said piston and head defining therebetween a chamber that decreases in volume responsive to said piston and rod moving in unison toward said head;

first and second peripheral grooves respectively located on the inner cylinder walls of said chamber respectively

located to connect to said port and located between said port and said piston;

a land disposed between said first and second grooves with a predetermined diameter intermediate the respective diameters of said rod and piston;

a first passage in said head connected to said first groove; a second passage in said head connected between said second groove and said first passage;



check valve means to prevent flow between said second and first passages; and

a ring formed on said rod having a preselected diameter greater than the rod diameter and less than the land diameter and an axial length and forming an annular restriction when axially moved into engagement with said land

whereby said annular restriction increases in length and cushion effect as said piston is moved toward said head.

3,913,452

REMOTELY MOVABLE PLATFORM

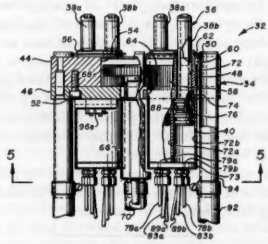
Charles Theodore Ward; Donald Lee Mathis; Frank Taylor Radcliff, and Richard Vorwerk, all of Chattanooga, Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 1, 1973, Ser. No. 384,658

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F15B *11/00*

U.S. Cl. 91—411 R **17 Claims**



1. A carriage for remotely controlled travel laterally of the surface of a member having a plurality of laterally spaced longitudinally extending openings in said surface thereof, comprising:

a. a base;

b. a stepping mechanism for said base including at least two substantially parallel fingers connected to said base and extending outward therefrom and being reciprocably movable in a first direction between extended and retracted positions relative to said base and sized for insertion in said member openings and at least one said finger being movable relative to said base a predetermined extent and in a second direction extending in a plane substantially normal to the longitudinal extent of said finger to step said base;

c. means for supporting said base proximate said surface of said member to allow insertion of said fingers in said openings in their said extended positions and to prevent said insertion in their said retracted position;

d. first remotely actuable means for selectively extending and retracting each said finger;

e. second remotely actuable means for moving said at least one finger relative to said base in a said second direction in said plane substantially normal to said finger; and

f. means for controlling actuation of said first and said second remotely actuable means, whereby said relative motion in said second direction between said at least one finger and said base acts to advance said base laterally relative to said member when said at least one finger is extended into said opening.

3,913,453

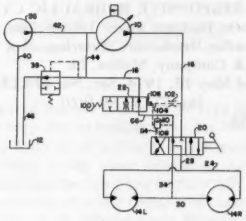
HYDROSTATIC TRANSMISSION

Donald James Parquet, Burlington, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 30, 1974, Ser. No. 502,173

Int. Cl.² F15B *13/042*

U.S. Cl. 91—420 **3 Claims**



1. A hydrostatic drive system for a vehicle comprising: a source of fluid pressure; a fluid reservoir; fluid motor means drivingly coupled to drive wheel means of the vehicle and having inlet and outlet ports; supply line means interconnecting the source and motor inlet port; return line means interconnecting the reservoir and motor outlet port; retarder valve means movable between open and closed positions and biased toward the closed position interposed in the return line means; pressure responsive means associated with the retarder valve means to move the same toward its open position in response to fluid pressure; first passage means establishing communication between the supply line means and pressure responsive means; second passage means establishing communication between the return line means and the pressure responsive means; valve means movable between open and closed positions and biased toward the closed position interposed in the second passage means; and means associated with the last mentioned valve means responsive to a predetermined pressure in the return line means to move the last mentioned valve means to its open position.

3,913,454

HYDRAULIC MOTOR

Roger John Nelson, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

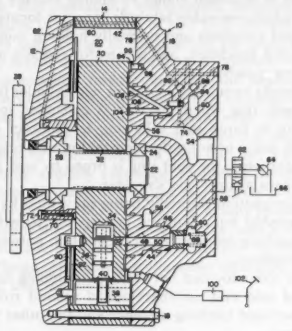
Filed Nov. 18, 1974, Ser. No. 524,506

Int. Cl.² F01B *1/06;* **B60K** *3/00;* **F16D** *55/36;* **F04B** *49/00*

U.S. Cl. 91—491 **17 Claims**

1. A hydraulic motor comprising: a housing; a drive shaft journaled in the housing; a rotor slidably mounted on the shaft and keyed thereto for rotation therewith; cam means in the housing; a plurality of cylinders provided in the rotor having outer ends open toward the cam means; a plurality of pistons mounted in the cylinders and projecting therefrom into engagement with the cam means; fluid passage means providing communication between the inner ends of the cylinders and one axial end of the rotor; pressure and exhaust ports provided in the housing; manifold means reciprocally mounted in the housing for axial movement and in engagement with the one

axial end of the rotor providing communication between the fluid passage means and the pressure and exhaust ports; means yieldably biasing the rotor toward the manifold; first and



second side-by-side brake elements secured to the housing and the second axial end of the rotor, respectively; and means for selectively sliding the rotor axially in a direction to frictionally engage the brake elements.

3,913,455

RADIAL-PISTON ROTARY HYDROSTATIC MACHINES

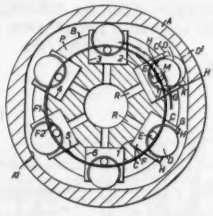
Paul Clifford Green, and Keith Oswin Moore, both of Coventry, England, assignors to Newage Engineers Limited, Stamford, England

Filed Jan. 23, 1974, Ser. No. 435,955

Claims priority, application United Kingdom, Apr. 9, 1973, 16895/73

Int. Cl.² F01B *13/06*

U.S. Cl. 91—492 **9 Claims**



1. A positive-displacement cam-controlled rotary hydrostatic pressure machine comprising a cylinder block having a bank of angularly-spaced radial cylinders, radially-reciprocable pistons in the cylinders, a cam ring mounted coaxially with the cylinder block for rotation relative thereto, an endless circumferential cam track on the cam ring, the pistons carrying cam followers which coact with the cam track to relate the cyclic radial reciprocation motion of the pistons to rotary motion of the cam ring relative to the cylinder block, valve means cyclically controlling the inlet and discharge of hydraulic fluid to and from the cylinders in synchronism with the rotary motion of the cam ring relative to the cylinder block, and a radially-resilient circular leaf spring comprising a spring strip curled lengthwise into circular form with its two ends overlapping one another, the spring acting resiliently and radially on the pistons in the bank to hold each piston resiliently in a radially-withdrawn position in which its follower is clear of the path of the cam track during rotation of the cam ring relative to the cylinder block with the cylinders unpressurized.

3,913,456

SLIDE BLOCK CONTROL MEANS FOR RADIAL PISTON MACHINES

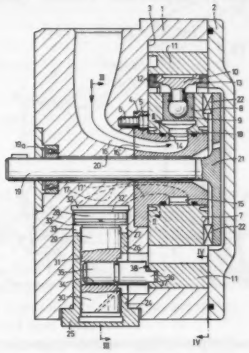
Paul Bosch, Ludwigsburg, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed July 19, 1973, Ser. No. 380,752

Claims priority, application Germany, Aug. 8, 1972, 2238952

Int. Cl.² F01B *13/06*

U.S. Cl. 91—497 **16 Claims**



1. In an arrangement including at least one radial piston machine, a combination comprising a housing; a cylinder block rotatably mounted in said housing and having a plurality of radial cylinder bores; pistons reciprocably installed in said cylinder bores and extending radially outwardly from said cylinder block; an annular slide block surrounding said cylinder block in said housing and being engaged by said pistons said slide block having an end face provided with an endless groove and being movable substantially radially of said cylinder block to thereby change the strokes of said pistons; and control means for moving said slide block relative to said cylinder block, including at least one displacing piston axially movable in said housing in substantial parallelism with said end face of said slide block, and motion transmitting means for moving said slide block relative to said cylinder block in response to axial movement of said displacing piston, said motion transmitting means comprising a pin secured to said displacing piston and having a portion extending into said endless groove of said slide block.

3,913,457

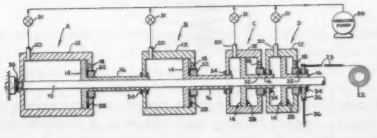
COUPLED PNEUMATIC CYLINDER ARRANGEMENT

Jack S. Hawley, Berkeley, Calif., assignor to Pneumeric Corporation, Castro Valley, Calif.

Filed July 3, 1974, Ser. No. 485,438

Int. Cl.² F15B *11/18, 15/24*

U.S. Cl. 92—13.3 **3 Claims**



1. An actuator arrangement comprising a shaft, supported upon said shaft separate first and second power cylinders in tandem relation, each of said cylinders having an individual housing and within said housing an annular piston head having a tubular stem slidably mounted upon said shaft and arranged

to project from said housing, the housing of said second cylinder being firmly supported upon the protruding end of the tubular piston stem of said first cylinder in juxtaposition with the housing of said first cylinder.

3,913,458

RESPIRATOR ACTUATING MECHANISM

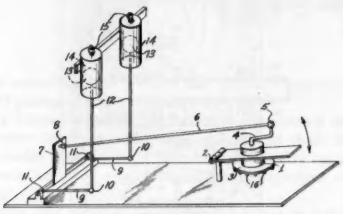
Guy Foures, 33 Cantenac, France

Filed Mar. 12, 1974, Ser. No. 450,477

Claims priority, application France, Mar. 15, 1973, 73.10425

Int. Cl.² F01B *31/04*

U.S. Cl. 92—13.7 **7 Claims**



1. Apparatus for providing respiratory assistance, said apparatus comprising a support carrying a variable speed electric motor connected to actuate spherical pistons in two pumps through appropriate linkage, one pump being connected to provide inhalation and the other exhalation, said motor carrying a crank at one end of its shaft which actuates said linkage, and said linkage comprising a connecting rod driven by said crank which transmits motion to a swinging member carrying projecting means, to which rods carrying the spherical pistons are connected, said motor being pivotally mounted on its support to swing about an axis parallel to but spaced from the axis of rotation of said swinging member, so that a change in the angular position of said motor varies the stroke of the connecting rod and consequently the stroke of the two pistons.

3,913,459

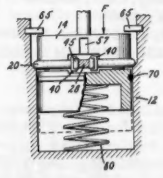
RING LATCH FOR RELEASABLY RESTRAINING A PISTON WITHIN A CYLINDER

Klaus M. Skreiner, Media, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Jan. 21, 1974, Ser. No. 435,142

Int. Cl. F15b *15/26*

U.S. Cl. 92—23 **8 Claims**



1. In combination, a cylinder, a piston reciprocable within said cylinder, means biasing said piston in a predetermined direction within said cylinder, and latching means for releasably restraining said piston with respect to said cylinder against said biasing means, said latching means comprising:

a. a circumferentially extending groove in the periphery of said piston,

b. a split ring located in said groove and extending about the periphery of said piston, said ring having a pair of ends that are spaced apart when said ring is in its expanded condition,

c. end members located between the ends of said ring and being of substantially larger cross section than the ring as viewed in sectional planes extending radially of the ring,

d. a radially-movable latching member located between said end members and normally holding said ring in its expanded condition, and means for radially moving said latching member,

e. a generally annular shoulder on said cylinder for engaging said split ring when the ring is expanded in a manner tending to force said split ring to contract within said groove into a non-interfering position with respect to said shoulder when the split ring is urged by said piston-biasing means against said shoulder,

f. said contraction normally being prevented by said latching member but occurring in response to withdrawal of said latching member from its position between the said end members,

g. a first roller located between said latching member and one of said end members and a second roller located between said latching member and the other of said end members,

h. said end members having surfaces on which said first and second rollers respectively roll in response to withdrawal of said latching member,

i. each roller also rolling on said latching member during withdrawal of said latching member so that said rolling action causes a shift of the axis of rotation of said roller relative to its associated end member in the direction of rolling,

j. and retaining means for retaining said rollers in position on said end member surfaces before, during, and after said rolling action and allowing the axis of rotation of each roller to shift during said rolling action.

3,913,460

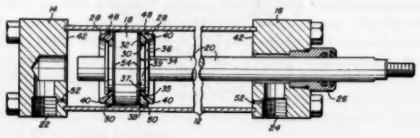
IMPACT DAMPING MEANS FOR FLUID CYLINDERS

Lee A. Wright, Centerville, Ohio, assignor to Mosier Industries, Inc., Brookville, Ohio

Continuation-in-part of Ser. No. 279,455, Aug. 10, 1972, abandoned. This application Jan. 15, 1974, Ser. No. 433,475

Int. Cl.² F01B *11/02*

U.S. Cl. 92—85 **33 Claims**

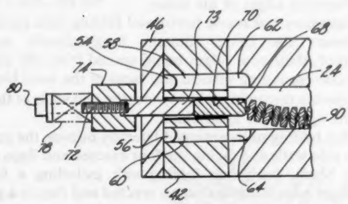


12. Impact damping means for a piston in a cylinder, comprising a cylinder having opposite end wall means, a piston means in said cylinder reciprocable toward and away from said end wall means, said piston means and at least one of said end wall means having cooperatively interengageable stop surfaces thereon defining at least one positive limit of travel of said piston means in said cylinder, one of said means having a recess therein including an annular mounting groove; a onepiece, circular, resiliently deformable combination impact and seal ring in said recess said ring having an inner surface, an outer surface and front and rear faces, said ring having an annular mounting flange thereon received in said groove and having one side thereof coplanar with the rear face of the ring, means for releasably securing said ring in said recess, an annular, continuous, axially projecting sealing lip on said ring projecting axially no farther than the stop surface containing said recessed means, and a single, annular, continuous, resiliently deformable bumper on said ring between said sealing lip and said mounting flange and projecting axially substantially

beyond said sealing lip and axialy outwardly of said recess beyond said stop surface containing said recessed means to engage the other of said means to dampen impact between said stop surfaces at the limit of travel of said piston means, the recess having a volume at least as large as the volume of said ring so that contacting engagement between said stop surfaces results in compacting of said ring and the deformed bumper into said recess, to thus enable the piston means to consistently travel its full stroke in said cylinder.

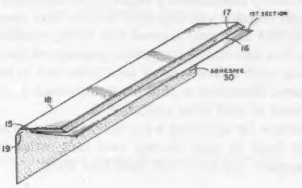
18. A combination impact-damping and sealing ring for fluid cylinders comprising: a circular ring of resilient, rubber-like material having an outer peripheral edge defining a circumference of the ring and an inner peripheral edge defining a central opening therethrough, a front fact and a rear face an annular, planar radially extending mounting flange adjacent one peripheral edge and having one side thereof coplanar with said rear face, an annular, continuous, axially projecting sealing lip adjacent the other peripheral edge, and a continuous, annular, resilient bumper intermediate said sealing lip and mounting flange, projecting in the same direction of and axially beyond said sealing lip.

3,913,461
FLUID REACTION DEVICE HAVING AN UNDULATORY FLEXIBLE WALL
Stephen H. Latawic, 5037 E. Outer Drive Apt. 201-H, Detroit, Mich. 48234
Filed July 27, 1973, Ser. No. 383,435
Int. Cl.² F01B *19/00;* **F16J** *3/00*
U.S. Cl. 92—89 **14 Claims**



1. A fluid reaction device comprising means forming a walled chamber, fluid inlet means at one end of said chamber, fluid outlet means at the opposite end of said chamber, said chamber being adapted to accommodate fluid flowing therethrough along an axis generally in a direction between said inlet means and said outlet means, a flexible wall mounted in said chamber and being arranged and constructed to be compressed in said chamber into an undulatory configuration to form a series of oppositely directed crests along said axis with adjacent ones of said crests sealably abutting opposite walls of said chamber, said flexible wall being adapted to undergo undulatory motion in said chamber correlated to fluid flow through said chamber, said flexible wall having a first predetermined length along said axis when said flexible wall is in said compressed undulatory configuration, and retainer means on said device engaging said flexible wall to compress said flexible wall into said undulatory configuration, said retainer means comprising means resiliently urging an end portion of said flexible wall adjacent one end wall of said chamber in a direction along said axis toward the opposite end wall of said chamber to yieldably urge said flexible wall into said compressed undulatory configuration, at least part of said means resiliently urging said end portion being yieldably movable so that said flexible wall can elongate in a direction along said axis during undulatory motion of said flexible wall.

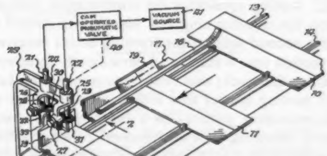
3,913,462
METHOD OF CONSTRUCTING A BOX CLIP
Olin B. Sparks, 8834 Birdwood Road, Houston, Tex. 77036
Filed July 16, 1973, Ser. No. 379,282
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B31D *1/02*
U.S. Cl. 93—1 E **2 Claims**



1. A method of constructing box clips from a substantially rectangular, pliable member, comprising:

a. dividing the member longitudinally into six parallel sections;
b. forming a first fold on the line between the first and the second sections;
c. installing a plurality of spaced-apart spring clips along the edge of said first fold;
d. covering the sixth section with an adhesive;
e. forming a second fold along the line between said second and third sections near the inner ends of said spring clips;
f. forming a third fold along the line between said fourth and fifth sections; and
g. adhering said first section to said sixth section to thereby enclose said spring clips by said folds.

3,913,463
APPARATUS FOR OPENING TUBES OF FLEXIBLE MATERIAL
Clinton R. Hollis, Camden, Ark., assignor to International Paper Company, New York, N.Y.
Division of Ser. No. 267,361, June 29, 1972, Pat. No. 3,834,287. This application July 5, 1974, Ser. No. 485,700
Int. Cl.² B31B *1/80*
U.S. Cl. 93—28 **5 Claims**



1. In combination with apparatus for forming a closed bottom of a bag from an essentially flat tube of flexible material including a machine frame, means in said frame for folding the end of said tube to provide a plurality of overlying layers thereof while said end is in motion, means in said frame for moving said end of said tube into said folding means in a predetermined direction for said folding, and means operatively coupled with said folding means for securing said overlying layers to form said bag bottom, apparatus operatively coupled with said folding means for opening said end of said tube while said end is in motion in said direction prior to completion of said folding thereof, comprising:

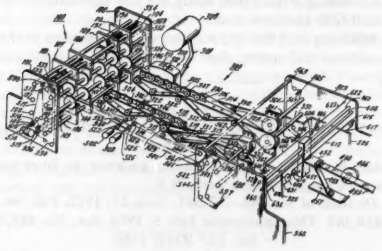
a. a first suction cup;
b. a support member;
c. means for rotating said suction cup at a predetermined angular velocity about a first axis which is positioned in said support member, said means including a single pivotal connection means on said suction cup for rotatable connection thereof with said support member and for defining said first axis;
d. means for rotating said support member at an angular velocity substantially equal to but opposite in direction to said angular velocity provided by said means (c) about a second axis, said second axis being positioned to provide a first essentially tangential passage of the suction face of cup with a first wall of said tube end in substantially the same direction as said predetermined direction of movement of said tube end; and
e. means for applying a suction pressure to said suction cup at least in part during said tangential passage of said suction cup face with said first wall.

3,913,464

POSITIONING MEANS FOR HOLD-DOWN

Stephen S. Flaum, New York, N.Y., assignor to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Filed Nov. 22, 1974, Ser. No. 526,394
Int. Cl.² B31B *3/74, 1/98*
U.S. Cl. 93—36.3 **8 Claims**



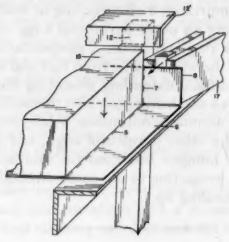
1. In box making apparatus the combination comprising a first section for transforming box blanks into folded tubular boxes and a second section for forming boxes received from said first section into a stack and periodically removing piles of boxes from the stack; said first section including conveyor means for moving blanks and folded tubular boxes along a feed path extending parallel to a reference line; said first section also including first and second folding portions on opposite sides of said reference line for inwardly folding respective first and second outboard panels of box blanks along first and second score lines thereof to positions where the outboard edges of said blank are in juxtaposition at a joint area; said first and second score lines being parallel to said reference line and being spaced therefrom by first and second distances, respectively; said second section including a hold-down means for applying downward pressure to the stack at the joint region; first and second adjusting means for positioning the respective first and second folding portions transversely in relation to said reference line in accordance with the respective first and second distances; and a cable system connecting both of said folding portions to said hold-down means to move the latter transverse to said reference line to automatically maintain said hold-down means at said joint area as said joint region shifts with changes in said first and second distances.

3,913,465

FOLDING DEVICE FOR BOX MAKING MACHINES

Jürgen Keck, Niefern-Oschelbronn, Germany, assignor to Gebrueder Bellmer KG Maschinenfabrik, Niefern, Germany

Filed Nov. 13, 1973, Ser. No. 415,322
Claims priority, application Germany, Nov. 18, 1972, 2256709
Int. Cl.² B31B *1/46*
U.S. Cl. 93—51 R **6 Claims**



1. A device for the folding of box blanks into boxes which have a bottom wall, two longitudinal side walls with end flaps extending therefrom, and two end walls, the device comprising:
a vertically descending rectangular head block having a horizontal bottom and vertical sides corresponding to the inside dimensions of a finished box;
stationary rail means for erecting the two side walls of a blank against the descending head block;
two pairs of stationary lateral guide columns, each pair guiding one erected side wall against the head block near the vertical edges of the latter;
two stationary transverse horizontal folding rails extending between the guide columns longitudinally outside thereof, their near edges being spaced from the path of the corresponding vertical end faces of the head block to cooperate therewith so as to erect the end walls of the box blank against the head block;
four flap folding units arranged laterally outside the erected box side walls and facing the four erected end flaps of the box blank, each flap folding unit including a folding plunger advancing against an erected end flap in a generally horizontal reciprocating motion along a path directed obliquely against the end flap so as to have a motion component which is directed against the end face of the head block.

3,913,466

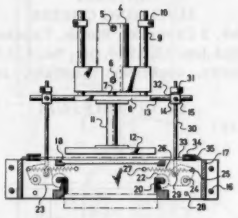
APPARATUS FOR MANUFACTURING BOXES

Oldrich Bayer; Josef Snasel, and Jiri Premyslovsky, all of Gottwaldov, Czechoslovakia, assignors to SVIT, narodni podnik, Gottwaldov, Czechoslovakia

Filed Mar. 14, 1974, Ser. No. 450,992
Int. Cl.² B31B *1/48*
U.S. Cl. 93—51 HW **6 Claims**

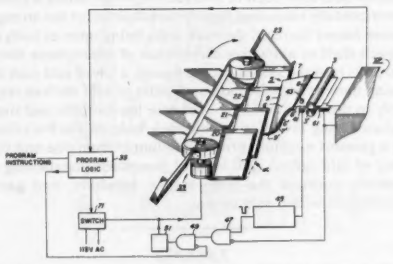
1. Apparatus for manufacturing boxes and the like from pre-cut blanks comprising a cooperating form frame and plunger, means for reciprocating said plunger into and out of said frame to fold said blank, said frame having at least one locking plate adapted to swing on passage of said plunger into and out of said frame to fold-in the edge of said blank, and means for swinging said locking plate comprising a pinion gear secured to the axis of said locking plate, a segment gear meshing with said pinion, a rod pivotally linked to said segment gear and adjustably connected to said means for reciprocating said plunger to effect swinging of the plate outwardly of said frame on inward movement of said plunger and to permit said plate to swing inwardly of said frame on outward movement of said plunger, said adjustable connection of said rod to said

means for reciprocating said plunger comprising a clamp, said rod extending freely through said clamp and adjustable stop means located on the outer end of said rod, and means for



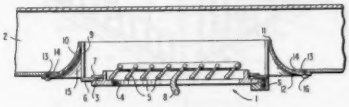
resiliently biasing said segment gear to urge said rod to normally permit engagement of the adjustable stop means against said clamp.

3,913,467
COLLATING APPARATUS
Edward C. Braband, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed Dec. 12, 1973, Ser. No. 423,956
Int. Cl.² B31B *1/94*
U.S. Cl. 93—93 DP **6 Claims**



1. A collating apparatus comprising:
means for propelling forward a horizontally disposed planar sheet member along its horizontal plane;
deflecting means comprising a pair of spaced parallel plates disposed and shaped for changing the orientation of the planar surface of said propelled sheet member so that said sheet member leaves from said deflecting means with the planar surface thereof at an inclined angle with respect to a vertical plane in parallel with the direction of the movement of said sheet member; and
a collecting bin positioned with its surface at an inclined angle with respect to a vertical plane in parallel with the direction of the movement of said sheet member and mated to receive said sheet member leaving said deflecting means.

3,913,468
AIR DISTRIBUTOR
Willi Krämer, Waiblingen, and Hans-Peter Schanzer, Stuttgart, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany
Filed June 9, 1972, Ser. No. 261,378
Claims priority, application Germany, June 11, 1971, 2128987
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B60H *1/26*
U.S. Cl. 98—2.15 **10 Claims**

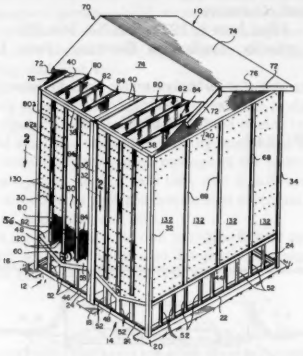


1. An air distributor at an air channel for heating, ventilating an air conditioning systems in vehicles, with a circular disk means provided with an air passage and rotatably supported at a support plate means, said circular disk means carrying slats pivotally adjustable about their respective longitudinal axis, one of said slats being provided with a handle to enable the circular disk means as well as the slats to pivot independently of one another, characterized in that the support plate means is connected by way of a web means with an annular flange means whose inner edge projects into the air channel and whose outer flange-like end portion serves for the fastening of the air distributor structure at the edge of an aperture provided in the air channel, the annular flange means includes a wall portion between the inner edge and the outer flange-like end portion, the wall portion extending into the air channel, the web means extends from the support plate means into the air channel for connecting a peripheral portion of the support plate means with the inner edge of the annular flange means and in that air slot means are defined between the wall portion of the annular flange, said support plate means and said web means for directing at least a portion of the distributed air in a predetermined direction parallel to the exterior of said air channel.

3,913,469
GRAIN BIN
Alvin Arnold, R.R. No. 7, Martinsville, Ind. 46151
Filed Oct. 25, 1974, Ser. No. 518,042
Int. Cl.² E04H *7/00*
U.S. Cl. 98—55 **10 Claims**

1. A grain drying a storage bin comprising structural means providing a sloping floor having a low point to which the grain flows by gravity and a ceiling and wall means extending generally vertically therebetween to define a space for receiving grain, and at least one divider disposed in said space to extend vertically therein from a point adjacent and spaced upwardly from said floor to a point adjacent said ceiling to divide said space into a plurality of generally vertically extending grain cells, said upward spacing of said divider allowing removal of grain from said bin at said low point on said sloping floor, each divider extending across said space to provide opposite vertically extending side edge portions adjacent, respectively, opposite sides of said bin, each divider being defined by a pair of vertically extending side walls spaced apart to provide a

vertical air space therebetween extending transversely across said grain receiving space between adjacent grain cells, and



said side walls being formed primarily by a mesh material through which the air circulates to dry the grain in said cells.

3,913,470

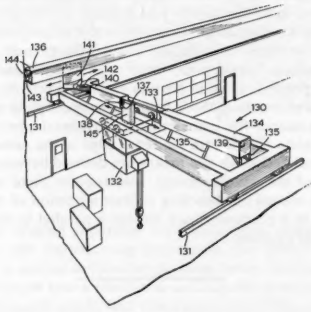
VENTILATING SYSTEM FOR TRAVELING CRANE CABS, EXHAUST HOODS AND THE LIKE

Patrick F. Cullen, Ancaster, Canada, assignor to Crane Air Trac Incorporated, Burlington, Canada

Continuation-in-part of Ser. No. 318,007, Dec. 26, 1972, abandoned. This application Aug. 9, 1974, Ser. No. 496,295

Int. Cl.[2] **F23J** *15/00*

U.S. Cl. 98—115 VM **14 Claims**



1. A ventilating system for a travelling gas-filled vehicle comprising a stationary elongated gas duct, a gas line connected in gas exchange relationship with said duct, an elongated slot located along the length of the gas duct, the slot having spaced apart opposed edges in the duct, a continuous sealing member in and along the full length of the slot and normally sealing the slot against flow of gases therethrough, said sealing member comprising two flexible flaps of elastomeric material, each flap having a sealing portion curled inwardly and substantially back on itself and with an open end, the open end being unattached and allowing a rolling action in the flap, one flap being attached to one edge and the other flap being attached to the other edge of the slot and the flaps being biased to bear against each other in sealing engagement and provide a seal for the slot, a gas delivery scoop, said scoop being attached to the travelling vehicle and having one end opening into the gas duct and the other end opening into the vehicle, the end of the scoop opening into the gas duct being slidably inserted in the elongated slot between the flexible flaps and being of flattened oblong configuration on a cross section thereof with acutely radiused edges, said edges being located in the slot to provide opening and closing of the slot with minimum gas leakage therefrom and a gas moving device connected to the gas line and gas duct.

3,913,471

MATURING CHEESE

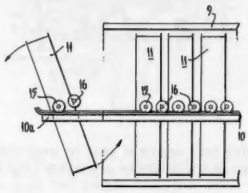
Milan Vyhnalek, 2 Crown St., Burnie, Tasmania, Australia

Filed Jan. 18, 1974, Ser. No. 434,727

Claims priority, application Australia, Jan. 23, 1973, 2002/73

Int. Cl.[2] **A01J** *25/16*

U.S. Cl. 99—452 **4 Claims**



1. A cheese maturation apparatus comprising at least one elongated tunnel having insulating walls, a pair of rails extending horizontally along the opposing side walls of said tunnel, a plurality of vertically extending cheese storage rack units movably mounted on said rails in closely adjacent side-by-side relation to one another within the tunnel to substantially fill the tunnel, the cross-sectional area of each rack unit substantially conforming to the cross-sectional area of said tunnel, said tunnel including space to allow the sequential inversion of each rack about its rail mount, the rail mount for each rack unit including a pair of rollers on each side thereof engageable with said rails to permit said unit to be moved along said rails and to facilitate periodic inversion of each rack unit and to stabilize said unit, each of said rack units including a plurality of horizontally extending superposed shelves for the storage of cheese loaves thereon, the rack units being open at both ends of each shelf to allow free circulation of atmosphere through said units past the stored cheese loaves, each of said rack units having battens between adjacent pairs of said shelves respectively to prevent the falling of cheese loaves from said storage shelves during inversion of said rack unit, means for circulating a gaseous medium through the tunnel from one end to the other of said tunnel, and control means for maintaining substantially constant the temperature, humidity, and gaseous constituents within said tunnel.

3,913,472

STRAPPING MACHINE WITH SHORT FEED LOCKOUT

Erville C. Buck, Springfield, Oreg., assignor to FMC Corporation, San Jose, Calif.

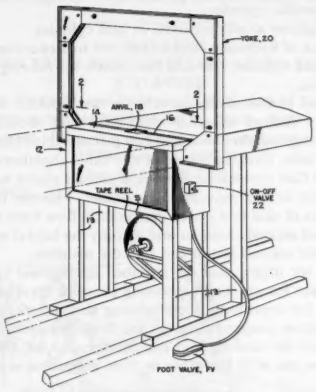
Filed Jan. 10, 1974, Ser. No. 432,382

Int. Cl.[2] **B65B** *13/06*

U.S. Cl. 100—4 **3 Claims**

1. Article strapping apparatus of the type comprising a reversible motor driving strap transport wheel means in one direction for feeding a strap through an article receiving yoke and between an anvil and gripper assembly to bring the end of the strap against a stop, means for thereupon closing the gripper to clamp the end of the strap against the anvil, and control means for reversing the motor to cause the transport wheel means to slip the strap free of said yoke and tension the strap about an article within the yoke; the improvement comprising an air orifice in said anvil and gripper assembly which orifice is blocked only when the strap end passes between said anvil and gripper assembly and the gripper closes, said control means comprising a source of air under pressure, a tensioning

initiating valve between said source and said orifice, and means for preventing reverse motion of said motor and said transport wheel means sufficient to withdraw the strap from



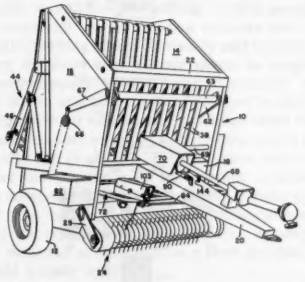
said yoke when said tension initiating valve is opened and said orifice is open due to failure of the end of the strap to reach said gripper during said strap feeding operation.

3,913,473

BALE WRAPPING MECHANISM FOR LARGE CYLINDRICAL BALES

Gerald Franklyn Meiers, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Filed July 17, 1974, Ser. No. 489,350
Int. Cl.² B65B *13/20*
U.S. Cl. 100—5 **17 Claims**



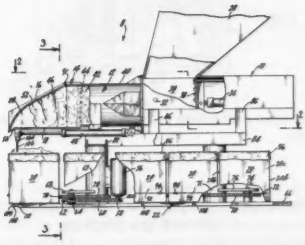
9. In a machine for forming large cylindrical bales of crop material and including a mobile main frame, and crop delivery means operative to deliver a mat of crop material to a baling zone where a bale forming mechanism rolls the mat of material into a bale and is operative to continue rolling the bale after it reaches a selected size while a wrapping element is fed to the baling zone to wind the wrapping element around the bale as it rotates, the combination therewith of an improved dispensing mechanism for selectively feeding the wrapping element from a supply of continuous wrapping element on the machine to the baling zone and comprising: a shiftable dispenser member operatively carrying the wrapping element and shiftable between a rest-condition, wherein it supports the free end of the wrapping element, and a dispensing condition wherein it is laterally shiftable on the machine forwardly of the baling zone to feed the wrapping element across a substantial portion of the baling zone as a formed bale rotates so that the wrapping element is wound around the bale; automatic cutoff means operatively associated with the dispensing member for cutting the wrapping element exteriorly of the dispensing member when the dispensing member is shifted to a predetermined position; and selectively actuable power motor means operatively connected to the dispensing member for shifting the member from its rest position and for shifting said member during its dispensing condition.

3,913,474

MULTI-CONTAINER TRASH COMPACTOR

Michael Lewis, Felton, Pa., assignor to Flinchbaugh Products, Inc., Red Lion, Pa.

Filed May 2, 1974, Ser. No. 466,237
Int. Cl.² B30B *15/32*
U.S. Cl. 100—45 **4 Claims**



1. A refuse compaction system comprising a cyclical compactor wherein the compacted refuse is emitted in a substantially continuous stream of separable slugs, a deflecting plate mounted obliquely to said stream of refuse and positioned to intersect the path of said stream of refuse; laterally operative door beneath said deflecting plate, said door being adapted to apply an axial force to said stream of refuse at one of said slugs substantially in the direction of movement of said stream such that said axial force encourages separation of said slugs.

3,913,475

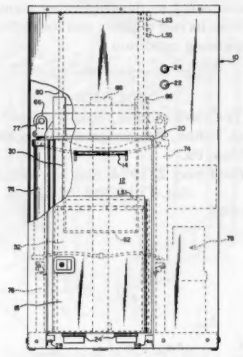
APPARATUS FOR THE COMPACTION OF REFUSE MATERIAL AND THE LIKE

Milton Clar, 9408 Linden Ave., Bethesda, Md.

Division of Ser. No. 261,325, June 9, 1972, Pat. No. 3,861,291. This application Jan. 14, 1974, Ser. No. 433,108
Int. Cl.² B30B *1/23*
U.S. Cl. 100—245 **4 Claims**

1. Compaction apparatus comprising a cabinet having a wall toward which refuse material or the like is to be compacted in said cabinet and having a tubular reciprocative compaction blade in said cabinet with a material-contacting end wall and a side wall extending away therefrom, means for moving said blade, with its end wall leading, from a first position away from said wall of said cabinet to a second position closer to said wall of said cabinet and for returning said blade to said first position, said blade moving means comprising a pair of fluid-driven rams having cylinders mounted at opposite sides of said cabinet along the direction of movement of said blade and having pistons with piston rods extending therefrom away from said cabinet wall to a region of said blade adjacent the end thereof remote from said end wall, where said rods are coupled to said blade for moving said blade conjointly, said piston rods being drawn into said cylinders toward said cabinet wall to move said blade to said second position, and the side wall of said blade extending for a substantial distance between said cylinders when said blade is at said second position, and means for guiding the reciprocative movement of said blade, said guiding means comprising means coupled to

said blade at different regions along the length of said side wall for preventing substantial lateral movement of the side wall of



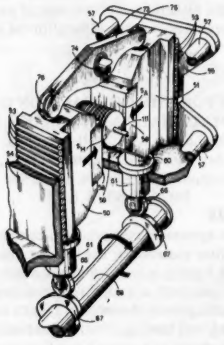
said blade in any direction perpendicular to said reciprocative movement.

3,913,476

MACHINE FOR EMBOSSING TYPE-ROLLERS FOR OFFICE MACHINES

Mario Maquignaz; Bruno Benedetto, and Antonio Lingeri, all of Ivrea (Torino), Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Torino), Italy

Division of Ser. No. 112,357, Pat. No. 3,804,006. This application Oct. 25, 1973, Ser. No. 409,431
Claims priority, application Italy, Feb. 5, 1970, 67363/70
Int. Cl.[2] B44B *5/00*
U.S. Cl. 101—7 **2 Claims**



1. Apparatus for embossing a cylindrically shaped blank to have at least a row of characters extending on its cylindrical surface, comprising:

means for supporting said cylindrically shaped blank in said apparatus in a position to permit embossing on the cylindrical surface thereof,

a pair of movable die members each having an active surface adjacent said cylindrical surface when said cylindrically shaped blank is supported by said supporting means, said active surface being a flat surface having characters for embossing said blank,

means for automatically moving one of said die members laterally along a first direction towards said cylindrically shaped blank at the beginning of each embossing cycle so that said active surface contacts said cylindrical surface and for automatically removing said die laterally from said cylindrically shaped blank at the end of each embossing cycle,

said moving means comprising:

an hydraulic cylinder,

a first piston axially movable in said cylinder,

a source of hydraulic fluid connected to a chamber defined by said cylinder and said first piston for moving said first piston,

a second piston axially movable in said cylinder and defining a second chamber therewith, said second piston, defining together with said first piston a third chamber for hydraulic fluid, said second and third chambers being in fluid flow communication, said second piston being connected to said movable die member, whereby the movements of said first piston causes fluid flow from said third to said second chamber and thereby the lateral movement of said second piston and said die member,

means for urging said die member against said cylindrical surface for exerting embossing pressure thereon, and

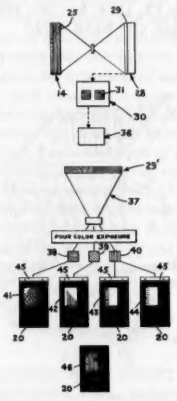
means for repeatedly reciprocating said die members in a direction perpendicular to the first direction, including means for causing said die members to be **180°** out of phase one with the other in their reciprocal movement.

3,913,477

PHOTOGRAVURE PROCESS FOR PREPARING A GRAVURE PRESS FOR MULTICOLOR PRINTING

Howard Howland, 88 Clinton Place, Hackensack, N.J. 07601, and Frank Pfleger, 2 Oak Place, Waldwick, N.J. 07463

Filed Aug. 22, 1974, Ser. No. 499,488
Int. Cl.[2] B41M *1/14*; G03F *1/00*
U.S. Cl. 101—211 **8 Claims**



1. The method of preparing a gravure press for multicolor printing which comprises making a record of the color percentage breakdown of an original art work using means showing the color breakdown of the inks to be used in printing the original art work, preparing a negative of the original art work using a given color photographic film, placing the color negative in a color analyzer capable of producing a positive color image therefrom, correcting the settings made on the color analyzer to produce such image to conform to the readings in said record of color percentage breakdown, feeding the corrected color analyzer settings into a negative translator capable of producing the exposure conditions for the colors in the original art work, using said color negative and such exposure conditions and given color filters to produce on color print paper positives of the separate colors in the original art work' and of a composite of such colors, checking and correcting the

colors of such color positives to bring them into conformance with the desired reproduction of the original art work, and preparing from the final corrected positives paper black and white negatives for use in forming the required images on the printing cylinders for reproducing the original art work.

3,913,478

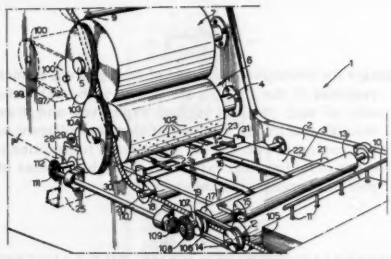
PRINTING PRESS WITH VARIABLE SPEED TRANSFER CYLINDER

Giancarlo Terzuolo, and Federico Capetti, both of Turin, Italy, assignors to Societa Nebiolo S.p.A., Turin, Italy

Continuation of Ser. No. 154,105. This application Sept. 27, 1973, Ser. No. 401,298

Int. Cl.² B41F *13/24*

U.S. Cl. 101—232 **9 Claims**



1. In a rotary printing press of the type having a constant speed rotary printing cylinder, a setting table, transport means for transporting sheets of material to be printed by said printing cylinder along said setting table, lateral setting means on said setting table for setting said sheets in lateral registration with respect to said printing cylinder while said sheets are on said setting table, a continuously rotating variable speed transfer cylinder tangential to said printing cylinder and to said table, longitudinal setting means carried by said transfer cylinder for setting the front edge of said sheets in longitudinal registration with respect to said printing cylinder without stopping said sheets, and holding means carried by said transfer cylinder operable for holding the individual sheet so set in contact with said transfer cylinder, and gripping means on said printing cylinder for gripping said sheet when said holding means reaches the periphery of the printing cylinder, the improvement comprising the diameter of the transfer cylinder being smaller than the diameter of the printing cylinder,

a safety device comprised of at least one sensory lever pivotally mounted at one end on a shaft parallel to the axis of said transfer cylinder,

means on said transfer cylinder urging said sensory lever to rotate so that its free end projects from the surface of said transfer cylinder,

means resisting said rotation of said sensory lever to maintain it in a position such that its said free end does not project from said surface of said transfer cylinder except for a period when said holding means on said cylinder passes the position where a sheet is picked up for transfer from said setting table,

a switch mounted at a relatively fixed position near said transfer cylinder, said switch, when actuated, operating to disable said holding means on said transfer cylinder,

an actuating member carried by said cylinder, means on said cylinder urging said actuating member towards an actuating position,

a latching member on said cylinder, said latching member locking said actuating member away from its actuating position when said sensory lever is in such a position that its end does not project from the surface of the cylinder.

3,913,479

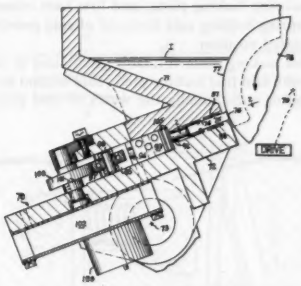
INK FOUNTAIN HAVING A CONTINUOUS METERING BAR WITH ZONAL ADJUSTMENT

Bert Cappel, Offenbach-Bieber; Siegfried Schuhmann, Offenbach, and Klaus Wolf, Neu-Isenburg, all of Germany, assignors to Roland Offsetmaschinenfabrik Faber & Schleicher AG,056in a position su Germany

Continuation-in-part of Ser. No. 371,594, June 30, 1973. This application Feb. 21, 1975, Ser. No. 551,630

Int. Cl.² B41F *31/04*

U.S. Cl. 101—365 **10 Claims**



1. In an ink fountain the combination comprising a frame defining a horizontal slot having parallel walls, a fountain roller rotatable in the frame adjacent the slot, a metering bar mounted in the slot and having a presented edge arranged in abutting relation with the surface of the roller, the frame being shaped to support a body of ink adjacent the metering bar so that a film of ink is formed on the roller by the bar as the roller is rotated, the metering bar being in the form of a continuous strip of tough resilient material having parallel side walls snugly fitted in the horizontal slot with only the presented edge portion extending therefrom, a plurality of adjusting mechanisms including respective grippers uniformly spaced along the rear edge of the strip to establish adjustable sections defining a series of zones of adjustment, the rear edge of the strip being deeply notched between adjacent grippers to form intermediate regions of reduced cross section so as to provide localized flexibility to permit independent relative movement of the adjusting mechanisms and localized metering of the ink film in the respective zones.

3,913,480

DEVICE FOR LOCKING UP FLEXIBLE PRINTING PLATES ON FORME CYLINDERS OF PRINTING PRESSES

Bertram Wilhelm-Georg Dauner; Helmut Hermann Marx, both of Wurzburg, and Karl-Heinz Arno Wolfram, Eibelstadt, all of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Wurzburg, Germany

Filed Apr. 17, 1973, Ser. No. 351,939

Claims priority, application Germany, May 23, 1972, 2225016

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B41F *27/02*

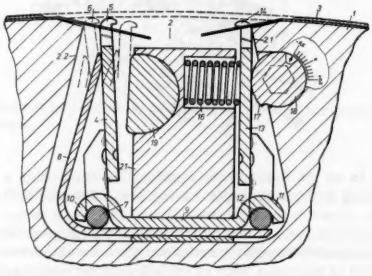
U.S. Cl. 101—415.1 **3 Claims**

1. A device for detachably holding flexible printing plates on forme cylinders of printing presses, said device comprising in combination:

a forme cylinder having an axially extending groove in its periphery;

a first locking plate rotatably positioned in said groove, said first locking plate extending substantially the width of said printing plate, said first locking plate having an axially extending hinge portion at its lower end and hook portions on its upper end, said hook portions being re-

ceivable in apertures in a first end of said printing plate;
a hold down bar secured in said groove;
a first cam means rotatably carried in an axially extending recess in said hold down bar, said first cam means and said hold down bar extending substantially the length of said groove, said first cam means having wrench receiving means on an end thereof for rotating said first cam means to cause said first cam means to press against a first side of said first locking plate throughout its length;
a leaf spring having a transversely extending bottom end positioned in said groove beneath said hold down bar and having an upper end which presses against a second side of said first locking plate, said first cam means and said leaf spring holding said first end of said printing plate in a selected position;
a second locking plate rotatably positioned in said groove opposite said first locking plate, said second locking plate extending substantially the width of said printing plate,



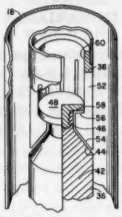
said second locking plate having an axially extending hinge portion at its lower end and hook portions on its upper end, said hook portions being receivable in apertures in a second end of said printing plate;
a second cam means rotatably carried in a wall of said groove and having wrench receiving means on an end thereof for rotating said second cam means to cause said second cam means to press against a first side of said second locking plate throughout its length;
a spring carried in said hold down bar and pressing against a second side of said second locking plate, said second cam means and said spring holding said second end of said printing plate in a selected position; and
a hinge plate, said hinge plate having semicircular end portions opening downwardly to secure said hinge portions of said first and said second locking plates, said hinge plate being positioned in said groove beneath said hold down bar and above said transversely extending bottom portion of said leaf spring.

3,913,481
APPARATUS FOR REDUCING SHOCK AND OVERPRESSURE

Carl E. Walter, Pleasanton, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 17, 1973, Ser. No. 398,262
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42B *3/02*
U.S. Cl. 102—21.6 **10 Claims**

1. In a system for the production of underground resources by the sequential detonation of a plurality of spaced apart nuclear explosives therein, a combination of elements in an emplacement string for connecting together a pair of adjacent nuclear explosives for emplacement of the explosives into a borehole comprising:
a pair of tubing string elements between said pair of adjacent nuclear explosives,
means for coupling together said pair of tubing string elements whereby all emplacement string elements including nuclear explosives below the upper of said pair of elements are suspended from said upper element, and

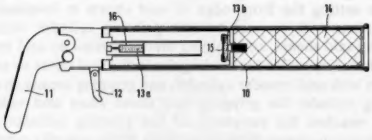


means for decoupling said pair of tubing string elements in response to the shock wave produced by detonation of one of said pair of nuclear explosives and traveling through that one of said pair of elements adjacent to said one explosive whereby the shock wave transmitted to the other of said nuclear explosives through the other of said pair of elements is attenuated.

3,913,482
MANUALLY-OPERATED PROJECTILE-LAUNCHING DEVICES

Alois Schiessl, Bad Reichenhall, and Paul Huber, Jettenberg, both of Germany, assignors to Firma Buck K.G., Bad Uberkingen, Germany

Filed Jan. 2, 1974, Ser. No. 429,738
Claims priority, application Germany, Jan. 5, 1973, 2300472
Int. Cl.² F42B *4/26, 4/02*
U.S. Cl. 102—32 **4 Claims**



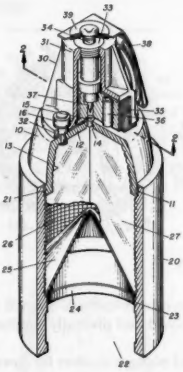
1. A manually-operated firing device having a handled guide tube, a projectile disposed in said handled tube having a greater weight than said handled tube, propellant charge means disposed in said handled tube, and triggering means for detonating said propellant charge to launch said projectile from said handled tube, said propellant charge means comprising:
an initial-stage propellant charge portion mounted on said guide tube behind said projectile for imparting initial velocity to said projectile within said guide tube; and
a final-stage propellant charge portion disposed behind and connected to the projectile at a distance ahead of said initial-stage charge portion such that ignition of said final-stage charge portion occurs in response to and subsequent to ignition of said initial-stage charge portion;
said final-stage charge portion being of greater weight than said initial-stage charge portion and being arranged to burn more slowly than said initial-stage charge portion at a rate sufficient to burn out prior to discharge of said projectile from said tube to accelerate the projectile from said initial velocity imparted by said first-stage charge portion to said discharge velocity.

3,913,483

GRENADE WITH FUZE

William G. Wolterman, Huntington Beach, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 11, 1972, Ser. No. 282,081
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42B *13/50*
U.S. Cl. 102—56 2 Claims



1. A dual purpose, artillery deliverable, submissile grenade for use against personnel and armored materiel targets which comprises:

a fragmenting, anti-personnel, hollow housing means, having a closed first end and a second open end which includes;

a hollow tubular member having an internally threaded end, a second unthreaded end, an internal concentrically protruding stand off wall rib positioned intermediate said threaded and unthreaded ends, an embossed inner housing wall intermediate said threaded end and said wall rib; and

a hollow cap having an externally threaded open end threadedly engaging said internally threaded end, said cap having an axially located cap lead train bore therein;

a hollow shaped charge cone positioned intermediate said first and second ends;

an explosive means charge which includes;

a high explosive shaped charge positioned intermediate said shaped charge cone and said closed first end for fragmenting said housing means, melting said shaped charge cone, and providing a high velocity molten jet stream from said open end against said target; and

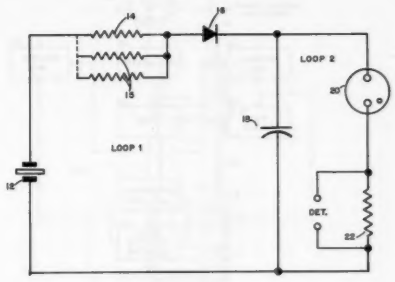
a fuzing means fixedly attached proximate to said closed end for initiating said explosive means upon impact of said grenade on said target and for holding said grenade in a safe unarmed position when said grenade is being delivered by said artillery to said target.

3,913,484

ELECTRONIC COUNTING FUZE

Carl J. Gardner, Wharton, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Feb. 3, 1971, Ser. No. 112,422
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42C *11/00*
U.S. Cl. 102—70.2 R 5 Claims



1. A counting fuze for a land mine having a detonator, comprising:

an electrical source unit providing an output only when subject to pressure which includes:

a pressure-sensitive switching means; and

a source of electrical power, said source connected to said switching means, said source of electrical power activated and inactivated by respective closings and openings of said pressure-sensitive switching means;

a charge storage means, said storage means receiving a charge in pulse form from said electrical source unit upon each subjection of said source unit to pressure; and

electronic gating means, said gating means being connected intermediately between said storage means and said detonator, whereby said detonator will be activated after successive applications of pressure to said electrical source unit.

5. An electrical counting fuze, for a land mine having a detonator comprising seven circuit loops.

a first loop comprising in series connected relationship, a first capacitor, one closure of a double-pole single-throw switch, a second closure of said double-pole single-throw switch, and a battery;

a second loop comprising in series connected relationship, said battery, said second closure, a single-pole single-throw switch and a first resistor;

a third loop comprising in series connected relationship, said first resistor, a second capacitor, and a first blocking diode;

a fourth loop comprising in series connected relationship, said first blocking diode, a second blocking diode and a third capacitor;

a fifth loop comprising in series connected relationship, said third capacitor, a Shockley diode, and a second resistor;

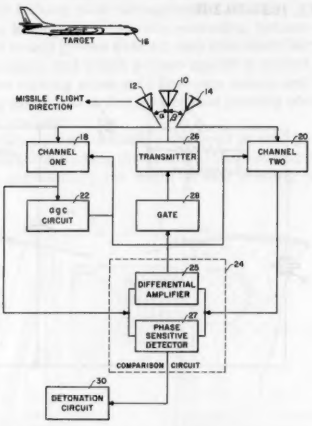
a sixth loop comprising in series connected relationship, said second resistor, a trigger of a silicon control rectifier, and a cathode of said silicon control rectifier; and

a seventh lead loop comprising in series connected relationship, said trigger, an anode of said SCR, said detonator, said single-pole single-throw switch, said second capacitor, said second blocking diode, and said Shockley diode.

3,913,485
ACTIVE PASSIVE FUZING SYSTEM

Daniel D. Holmes, and Albert Weiss, both of Riverside, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 7, 1962, Ser. No. 215,467
Int. Cl.² F42C *13/04*
U.S. Cl. 102—70.2 P **4 Claims**



1. An active passive fuzing system for use in a guided missile comprising:

a. means for transmitting radio frequency energy,

b. first receiving circuit means including a receiving antenna that is oriented to receive signals in the direction of missile flight and second receiving circuit means including a receiving antenna oriented to receive signals in the direction opposite to the direction of missile flight for receiving and detecting said transmitted energy reflected from a target to be detected,

c. comparison circuit means coupled to said first and second receiving means for comparing the magnitudes and phase of the received reflected signals and producing a detonating signal when like signals are received in each of said first and second receiving means, and

d. gate circuit means coupled to said comparison circuit means and being responsive to an output signal thereof to turn off said transmitting means when a countermeasures signal overrides the reflected signals from the target and turning said transmitting means on when said countermeasures signal ceases.

3,913,486
AUTOMATIC DELAY GRAZE SENSITIVE FUZE

Stephan Kosonocky, Whippany, and Lloyd D. Post, Dover; both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 3, 1973, Ser. No. 403,140
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42C *1/08*
U.S. Cl. 102—75 **6 Claims**

1. An automatic, graze sensitive, impact delay fuze for actuating a spin launched projectile which comprises:

a housing for holding said fuze therein, said housing having a forward end and a rear end;

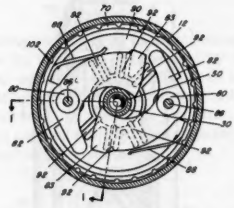
a cylindrically shaped plunger member slidably positioned in said housing, said plunger having a plunger forward end, a plunger rear end and a centrally positioned axially aligned plunger-holder bore therein, said plunger forward end having a plunger-slider bore larger than and axially aligned with said plunger-holder bore and communicating therewith, and a plunger-detent counterbore larger than, and axially aligned and communicating with said plunger-slider bore;

firing pin detent means axially positioned in said fuze for placing said fuze in a "commit" position after said projectile is launched and has impacted;

a detonator axially positioned proximate to the rear end of said plunger; and

biased firing pin means, operatively held by said firing pin detent means, for forcibly striking and exploding said detonator upon decrease of the decelerating forces of impact; and

spin detent means rotatably supported on said plunger member within said plunger-detent counterbore for holding said fuze in a "safe" position until such time as said projectile has seen a proper launch environment which includes;



a pair of nonsmmetrically U-shaped detent levers oppositely disposed and pivotally supported on said plunger member;

a disc shaped plunger-washer for operatively holding said detents to said plunger; and

a spring disc operatively positioned intermediate said U-shaped detents and said plunger-detent counterbore having a pair of detent springs integrally formed from said spring disc, said pair of detent springs biasedly holding said U-shaped detents so that said fuze is maintained in said "safe" position prior to said projectile being launched, and a plurality of radially positioned inwardly protruding restraining spring fingers operatively positioned intermediate said U-shaped detents and said plunger member for restraining said firing pin detent means so that said biased firing pin means will not be released by said firing pin detent means until said projectile impacts.

3,913,487
PROJECTILE

George H. Scherr, Park Forest, Ill., assignor to George H. Scherr, Park Forest, Ill.

Filed Sept. 7, 1973, Ser. No. 395,046
Int. Cl.² F42B *11/00*, *13/00*
U.S. Cl. 102—92.1 **13 Claims**

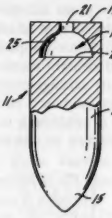
1. A projectile adapted to be propelled from a gun barrel by expanding gas,

said projectile having a generally cylindrical body with a tapered nose at one end and a transversely extending flat base at the opposite end,

a chamber formed in said body forward of the base with said chamber having a wall at the nose end thereof extending generally transversely of the projectile body, and

an outlet passage of generally constant transverse cross-section extending from said chamber through said base with the transverse cross-sectional area of said outlet passage being less than that of the transverse cross-sectional area of said chamber nose end wall,

the total transverse surface area of the base less the area of the outlet passage, and the transverse surface area of the

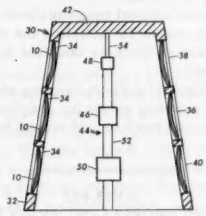


nose end wall of the chamber being greater than the total transverse surface area of the base including the area of the outlet passage.

3,913,488
BALLISTIC DISC

Bryant R. Dunetz, Churchville, and Seymour Kronman, Aberdeen, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 17, 1973, Ser. No. 397,527
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42B *23/06*
U.S. Cl. 102—92.1 **12 Claims**



1. A substantially spherically curved metallic high-velocity ballistic disc of substantially circular periphery, said disc being non-disintegrating prior to impact and having a concave and a convex side, the curved central portion of said disc being of greater thickness than the peripheral portion of said disc, said disc prior to firing being yieldingly retainable about its periphery within a circular aperture of a casing with the concave side of said disc facing outwardly, and said disc upon being fired assuming a convex streamlined shape.

7. A munition comprising a casing having a curved side, a plurality of round apertures in said side, and ballistic discs according to claim **1** seated in said apertures.

3,913,489
PROJECTILE

Bruce W. Travor, Holland, Pa.; Samuel L. Brown, Willingboro, N.J., and Brian D. Wenocur, Audubon, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 19, 1973, Ser. No. 426,270
Int. Cl.² F42B *13/16, 13/04*
U.S. Cl. 102—93 **3 Claims**

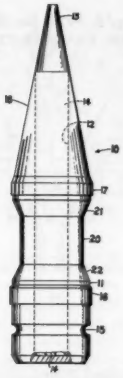
1. A projectile for selective use in smoothbore and spin imparting gun barrels, comprising

a main body having a forwardly opening cavity at one end thereof and means at the rearward end of said body for securing a cartridge case,

a nose penetrator member having a cylindrical portion secured in said cavity and a forwardmost conical surface portion,

a rotating band secured on said main body forwardly of said cartridge securing means,

an annular bore rider on said main body and longitudinally spaced forwardly of said rotating band, said main body having a conically tapered surface portion forwardly



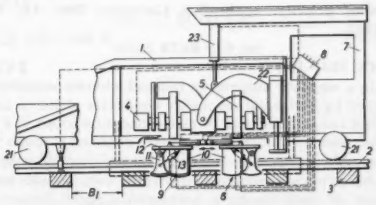
adjacent said bore rider and defining a continuation of said nose conical surface, and

means on said main body of said projectile for positioning an operational aerodynamic center of pressure rearwardly of a center of gravity for said projectile, said positioning means including an annular recess in the peripheral surface of said main body intermediate said bore rider and rotating band.

3,913,490
CRIB TAMPING MACHINE

Josef Theurer, Vienna, and Friedrich Oellerer, Linz, both of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft mbH, Vienna, Austria

Filed Nov. 25, 1974, Ser. No. 526,574
Claims priority, application Austria, Dec. 17, 1973, 10575/73
Int. Cl.² E01B *27/02*
U.S. Cl. 104—12 **9 Claims**



1. In a mobile track tamping machine, which comprises a frame mounted for mobility on a track having two rails affixed to ties, the ties resting on ballast and adjacent ones of the ties defining cribs therebetween, and vibratory surface tamping tools vertically adjustably mounted on the frame for engagement with the surface of the crib ballast, the tamping tools having tamping surfaces for engagement with the crib ballast and operative to tamp the ballast surface in the cribs, the improvement of means for selectively adjusting the size of the operative tamping surfaces in the direction of track elongation

for adapting the size of the tamping surfaces to the width of a selected crib.

3,913,491

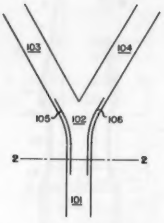
SWITCHING SYSTEM WITH ONBOARD AND WAYSIDE SWITCHING

John H. Auer, Jr., Fairport, and Lawrence M. Polsky, Rochester, both of N.Y., assignors to General Signal Corporation, Rochester, N.Y.

Filed Aug. 5, 1974, Ser. No. 494,434

Int. Cl.² E01B *25/12*

U.S. Cl. 104—130 **12 Claims**



1. A personalized rapid transit system comprising:

a. a vehicle guideway system having a plurality of diverge points for interconnecting the various branches of the guideway system;

b. a vehicle for traversing said guideway system from branch to branch via selected ones of said diverge points by cooperating with an encountered diverge point to form direction control means for controlling the direction of egress from the encountered diverge point;

c. said plurality of diverge points including active and passive diverge points; and

d. said direction control means comprising onboard control for cooperating with said active and passive diverge points to conjointly control the direction of egress from an encountered one of said active and passive diverge points.

3,913,492

SWITCH FOR A MAGNETIC SUSPENSION RAILROAD

Hans-Jürgen Düll, Langensendelbach, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 23, 1974, Ser. No. 472,683

Claims priority, application Germany, Dec. 14, 1973, 2362304

Int. Cl.² E01B *25/06*

U.S. Cl. 104—130 **2 Claims**

1. In a magnetic suspension railroad wherein suspension is obtained by horizontal secondary conductor elements on the roadbed cooperating with primary conductor loops in a vehicle and wherein guidance is similarly obtained through vertical secondary conductor members on the roadbed cooperating with primary conductor loops in the vehicle, with normal sections of track having a horizontal support element and vertical guidance element on each side, an improved switch for switching between a main track and a branch track comprising:

a. a first support and guidance arrangement including a horizontal secondary conductor element and a vertical secondary conducting element extending in a first direction from the entry point of the switch;

b. a second similar arrangement on the other side of the entry point of the switch extending in another direction;

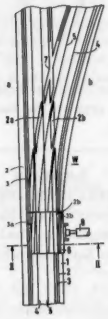
c. a first horizontal support element extending from the entry point of the switch parallel to said first guidance and support member;

d. a second horizontal support element extending parallel to said second guidance and support arrangement crossing said first support element at a stationary frog;

e. means at the entry point of the switch coupling said switch with a straight section of track comprising:

f. first support and guidance coupling means for coupling said one side of said straight section of track to said first guidance and support arrangement on one side;

g. second support and guidance coupling means for coupling the other side of said track to said second guidance and support arrangement on the other side;



h. said first and second means having a separation greater than the spacing of the support and guidance elements on a normal track section;

i. a first horizontal support coupling element parallel to said first coupling means for coupling the other side of said normal section of track to said first horizontal support element; and

j. a second horizontal support coupling element parallel to said second coupling means for coupling the one side of said track to said track to said second horizontal support element.

3,913,493

SYSTEM FOR PROPELLING TRAIN BY LINEAR SYNCHRONOUS MOTOR

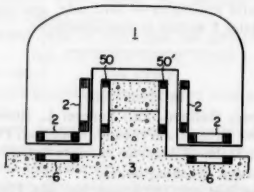
Naoki Maki, Tokaimura; Hironori Okuda, Hitachi; Takashi Tsuboi, Katsuta; Takao Miyashita, Mito, and Takao Takahashi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 15, 1973, Ser. No. 415,952

Claims priority, application Japan, Nov. 25, 1972, 47-118211

Int. Cl.² B61B *13/08*

U.S. Cl. 104—148 SS **7 Claims**



1. A system for propelling a train by a linear synchronous motor comprising a vehicle to be propelled along a track on the ground, first magnetic field generating means mounted on said vehicle, a group of propelling coils electro-magnetically coupled to said first magnetic field generating means for imparting propelling force to said vehicle, means for levitating

said vehicle from the ground, and an a.c. power supply disposed on the ground for supplying electrical power to said propelling coil group, wherein said propelling coils are disposed in pairs along said track on opposite sides of the center line of said track, and said propelling coils in individual pairs are connected in parallel to form a first group of short-circuited coil units.

3,913,494

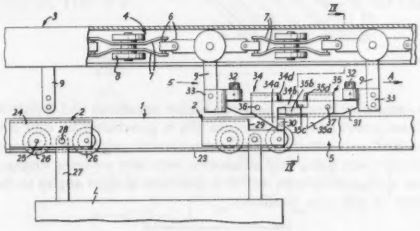
CONVEYOR SYSTEMS

Ronald Bruce Coleson, Palos Verdes, and Joel Paul Wood, Rowland Heights, both of Calif., assignors to Hytrac Conveyors Limited, Leicester, England

Filed Dec. 20, 1973, Ser. No. 426,458

Int. Cl.² B61B *13/00*

U.S. Cl. 104—172 S **7 Claims**



1. A conveyor system comprising a plurality of load carriers mounted for free movement in a trackway, an elongate driving element which in use travels above the trackway and means for disengageably connecting said element with at least one of the load carriers so that the latter is driven along by the element, wherein the improvement comprises: at least one drive dog on said driving element, the drive dog comprising a first, driving, pivoted latch member which is gravity-loaded to normally project downwards from said element for driving engagement with a load carrier in the trackway beneath said drive dog, and a second pivoted latch member positioned in advance of the first latch member in the direction of movement of the driving element and which is gravity-loaded to project downwards from the dog for contact with a load carrier in the trackway beneath said drive dog, the second latch member being adapted to be pivoted out of its normal position in the event that it meets an obstruction in its path, means on said second latch member in engagement with the first latch member so as to pivot the latter upwardly out of its normal driving position and disengage the drive, said first latch member being movable out of its normal driving position independently of the second latch member, each driveable load carrier comprising a body having a planar upper surface, said upper surface including a cut out portion extending between a bar member adjacent the leading end of said load carrier and a rear portion extending from said cut out portion to the trailing end of said load carrier, said rear portion extending a distance greater than the spacing between the latch members on the drive dog so that, as the drive dog approaches a stationary load carrier, the driving latch member is lifted by said second latch member and held upwards out of its driving position for disengagement from said driveable load carrier, said spacing between said first and second latch members being greater than the thickness of said bar member such that, when the second latch member is forward of said bar member, the driving latch member is adapted to project downwards into said cut out portion for driving engagement with said transverse bar member.

3,913,495

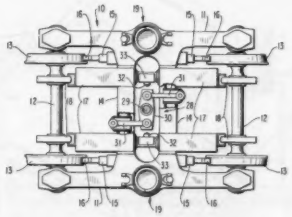
RAILWAY CAR BOGIE SUSPENSION SYSTEM

André E. Pelabon, Paris, France, assignor to ANF-Frangeco, S.A., Courbevoie, France

Filed Apr. 13, 1973, Ser. No. 350,805

Int. Cl.² B61F *3/08, 5/12, 5/20, 5/52*

U.S. Cl. 105—199 R **11 Claims**



1. In a suspension system for supporting a railway car, said car having an underframe to transmit the weight of the car to at least one downwardly projecting pivot pin, said bogie having a rigid frame means mounted on at least two pairs of track-engaging wheels; the combination including a pair of vertically elongated resilient cushioning means having their respective one ends horizontally fixedly attached at opposite sides of said bogie frame means and their respective other ends horizontally fixedly secured at spaced locations to said under frame, each of said cushioning means being vertically deformable to permit limited independent vertical displacement of each side of the bogie with respect to the car, each of said cushioning means being also laterally deformable to permit limited rotation of the bogie with respect to the car about the vertical axis of the pivot pin means and also to permit limited translatory displacement of the bogie with respect to the car in all directions in a horizontal plane, and linkage means connected between the pivot pin means and the bogie frame means to prevent said translatory displacement with respect to the longitudinal axis of the car.

3,913,496

ROAD-TRANSPORT VEHICLE-CARRIER

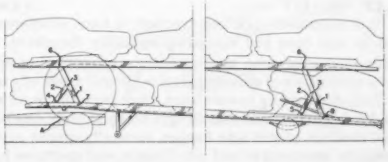
Robert Lohr, Strasbourg, France, assignor to Lohr-Construction de Vehicules Industriels S.A., Hangenbieten, France

Filed Oct. 26, 1973, Ser. No. 410,084

Claims priority, application France, Jan. 17, 1973, 73.02042

Int. Cl.² B61D *3/02*

U.S. Cl. 105—368 R **7 Claims**



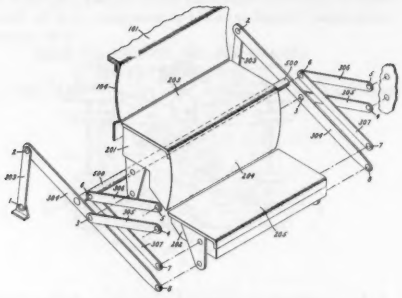
1. A road transport vehicle carrier, comprising a road vehicle chassis, a lower platform supported by said chassis, a plurality of front and rear posts supported on said lower platform, an upper platform articulatedly carried by the upper ends of said front and rear posts, and means mounting the lower ends of said front and rear posts for movement lengthwise along the lower platform thereby to raise and lower both the front end and the rear end of said upper platform.

3,913,497

MOVABLE STEP ASSEMBLY FOR TRANSIT VEHICLES

Max Maroshick, Glen Mills, Pa., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 23, 1974, Ser. No. 517,360
Int. Cl.[2] B61D 23/02
U.S. Cl. 105—447 3 Claims



1. Movable steps for use on vehicles to facilitate movement of passengers to or from said vehicle comprising:

a. A stairwell, enclosed by movable entry doors,

b. A first step member operatively mounted in said stairwell having a horizontally disposed upper tread surface and a convexly curved riser,

c. A second step member operatively mounted in said stairwell having a horizontally disposed upper tread surface,

d. Actuating means operatively associated with said step members for varying the vertical position of said step members,

e. Vehicle structure enclosing said stairwell having a concavely curved riser maintained in close proximity to the rear face of the upper tread surface of said first step member,

f. Linkage means connecting said first and second step members and said vehicle structure surrounding said stairwell, whereby the upper tread surfaces of the step members are maintained in a horizontal position as the said members are moved vertically, and the second step member is moved perpendicularly to said horizontal tread surface, so that said second step member maintains a constant close proximity to said entry doors.

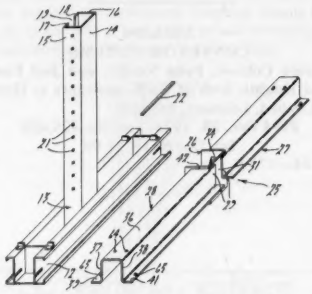
3,913,498

CANTILEVER RACK

Lee Z. Hall, Huntington Woods, and Richard B. Rowader, Detroit, both of Mich., assignors to Palmer-Shile Company, Detroit, Mich.

Filed Oct. 9, 1973, Ser. No. 404,484
Int. Cl.[2] A47B 57/20
U.S. Cl. 108—111 5 Claims

1. In a cantilever rack construction, a base, a column secured to said base and extending upwardly therefrom, said column having an open rectangular box cross section with a central web, a pair of parallel side flanges and a pair of spaced end flanges extending toward each other from the outer ends of said side flanges, said end flanges being entirely within the lateral confines of said side flanges, vertically spaced pairs of rectangular apertures in said side flanges, said apertures being inclined downwardly and away from said web, an arm comprising a U-shaped connector having a web adapted to engage the column web and a pair of flanges extending in parallel relation from the outer edges of said web and adapted to embrace the side flanges of said column, a pair of aligned apertures in said connector side flanges, the edges of said connector apertures remote from the connector web being inclined at the same angle as said column apertures, two arm members secured to said connector, each arm member comprising an upper web, a pair of side flanges extending downwardly in parallel relation from the opposite edges of said web, the inner end of each arm member being secured to said connector so that said arm member webs are above said connector apertures and said arm member side flanges are on opposite sides of said connector apertures, and a rectangular



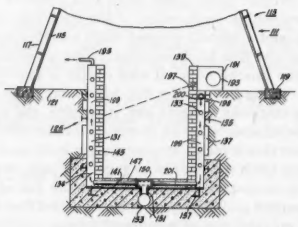
pin extending through said connector apertures and a pair of column apertures whereby said pin is concealed by said column and arm members and a downward weight on said arm members will bring said connector web into wedging engagement with said column web in a direction at right angles to the extent of said arm members.

3,913,499

REFUSE BURNER APPARATUS

Ralph E. Watts, Florence, S.C., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 339,337. This application May 30, 1973, Ser. No. 364,022
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] F23G 5/12
U.S. Cl. 110—8 C 7 Claims



1. In a refuse burner apparatus including a hollow wall structure of inner and outer spaced-apart plates and a layer of insulating material disposed on said inner wall plate, with a layer of refractory material covering the insulating layer; with a cap plate covering the top of the wall structure; and with a bottom plate on which the wall structure rests, the combination with said wall structure of:

a. a first conduit communicating with said hollow wall structure for introducing a cooling fluid thereinto to cool said wall structure;

b. means for introducing a cooling fluid into said first conduit;

c. means for flowing said cooling fluid out of said wall structure;

d. a second conduit carrying said cooling fluid; and

e. a third conduit communicating with said second conduit and having a plurality of nozzles that direct fluid flowing in said third conduit into said burner apparatus.

7. In a refuse burner apparatus, the improvement comprising:

a. a hollow wall structure comprised of inner and outer membranes with means therebetween for maintaining said membranes in spaced-apart relation;

b. means for introducing a cooling fluid into one portion of said hollow wall structure; and

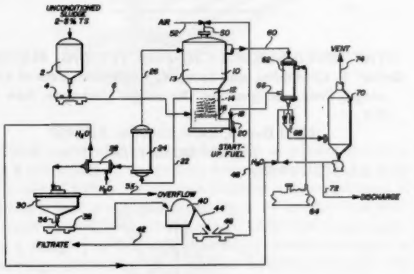
c. means for conveying said fluid from said one wall structure portion to another wall structure portion.

3,913,500

HEAT TREATMENT OF WASTE SLUDGES

James Dennis Paccione, Glen Ellyn, and David Moore O'Meara, Joliet, both of Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed May 1, 1974, Ser. No. 465,869
Int. Cl.² F23G *5/02*
U.S. Cl. 110—8 F **23 Claims**



1. A method of incinerating high moisture sewage sludge which comprises:

providing a combustion chamber containing a body of hot inert granular material having heat-storing and heat radiating capability;

supplying an oxygen containing fluidizing gas to said granular material in order to form a fluidized bed thereof;

continuously feeding high moisture sewage sludge through a heat exchange means located in heat exchange relationship with said fluidized bed, whereby said sludge is heated to an elevated temperature and an elevated pressure;

holding said heated sludge at an elevated temperature and an elevated pressure for a time sufficient to permit effective conditioning;

dewatering said conditioned sludge to raise the solids level to at least 10 percent by weight;

feeding said dewatered sludge into said fluidized bed, wherein said sludge is incinerated.

13. An apparatus for heat treatment and incineration of high moisture sewage sludges containing from about 1 to about 8 percent solids which comprises:

a fluidized-bed reactor having heat exchange means therein; said heat exchange means adapted to continuously heat high moisture sludge to elevated temperatures and elevated pressures;

means to hold said sludge at elevated temperatures and elevated pressures for a time sufficient to effectively condition said high moisture sludge;

dewatering means in fluid communication with said sludge holding means, said dewatering means adapted to raise the solids level of said conditioned sludge to at least 10 percent by weight, and

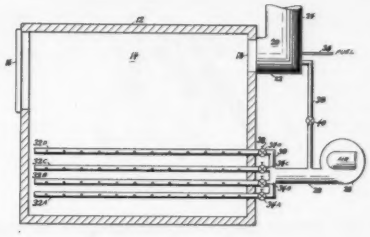
means to continuously feed said dewatered sludge to the reaction zone of said fluidized bed whereby said sludge is incinerated.

3,913,501

AIR SUPPLY FOR INCINERATOR

Alex J. Dahar, Wellsville, N.Y., assignor to The Air Preheater Company, Inc., Wellsville, N.Y.

Filed Nov. 29, 1974, Ser. No. 528,530
Int. Cl.² F23G *5/00*; F23L *3/00*
U.S. Cl. 110—8 R **6 Claims**



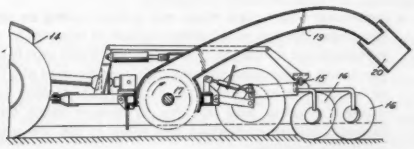
1. An incinerator for the incineration of organic matter in a charge of waste material that contains organic and inorganic values comprising in combination a combustion chamber including a loading opening for the admission of waste material therein and an outlet opening for the exhaust of pyrolyzed gas therefrom, means for the collection of ash at the bottom of the combustion chamber, a source of air for combustion, means supplying combustion air from said source to the combustion chamber including a plurality of vertically spaced passageways at the lower portion of the combustion chamber, and means controlling air flow through each of said passageways whereby the flow of air may be curtailed through the passageways that lie subjacent the level of ashes at the bottom of the combustion chamber to thereby terminate combustion of residual matter in the ash and the volatilization of inorganic matter that produces a haze forming gas.

3,913,502

METHOD OF FARMING

Clarence B. Richey, 2217 Delaware Drive, West Lafayette, Ind. 47906

Filed Sept. 17, 1973, Ser. No. 398,246
Int. Cl.² A01C *1/00*
U.S. Cl. 111—1 **4 Claims**

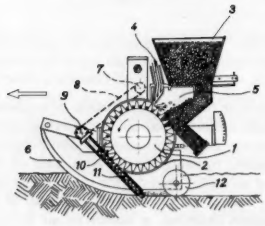


1. The method of preparing a field which has crop residue therein for subsequent row crop planting comprising removing the crop residue from the ground, shredding said residue, forming ridges in the cleared ground, and then redepositing the residue on the surface of the ground between said ridges behind the ridge-forming means so as to leave the tops of the ridges substantially clear of residue.

3,913,503
APPARATUS FOR PLANTING INDIVIDUAL SEEDS IN PREDETERMINED LOCATIONS

Reinhard Becker, Oberweser, Gieselwerder, Germany, assignor to Karl Becker KG, Gieselwerder, Germany

Filed Dec. 14, 1973, Ser. No. 424,801
Claims priority, application Germany, Dec. 15, 1972, 2261344
Int. Cl.² A01C 7/18
U.S. Cl. 111—77 11 Claims



1. In a planter for placing seed individually onto or into the soil and having a casing with a carrier such as a drum or belt with particularly spaced compartments and movably disposed inside of the casing, further having means for separating seeds from a bulk and placing individual seeds into the individual compartments, the casing having an opening along which the compartments pass in sequence and through which a seed may drop out of the respective compartment when passing the opening, the improvement comprising:

a feed-worm with helical ridge and groove having an upper and lower portion and having a pitch in relation to said compartment spacing such that the feedworm as it rotates can receive from said opening only a single seed at a time between any two adjacent ridges the upper protion being located adjacent said opening to receive seeds falling through, the lower portion extending to the soil underneath the machine;

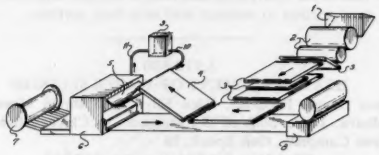
a tubular casing containing the feedworm and affixed to the casing of the machine and having an opening adjacent said opening in the casing of the machine; and

means for synchronously driving said compartment carrier and said worm, so that the seeds as disposed from the compartments onto the feed worm are moved down by the feed-worm in spaced apart relation as established by the passage of the compartments past said openings and maintained by the worm as moving the seeds down the tubular casing for direct depositing onto or into the soil.

3,913,504
METHOD AND DEVICE FOR CONTROLLING A UNIFORM FLEECE SUPPLY DURING TUFTING

Dieter Grenzendorfer, and Hans-Dieter Hentschel, both of Karl Marx Stadt, Germany, assignors to VEB Wirkmaschinenbau Karl-Marx-Stadt, Karl-Marx-Stadt, Germany

Filed Jan. 18, 1973, Ser. No. 324,621
Int. Cl.² D05C 15/34
U.S. Cl. 112—79 R 7 Claims

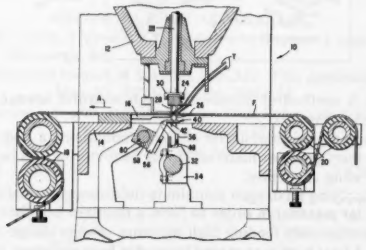


7. Apparatus as claimed in claim 5 wherein said differential case drives an operating member associated with a speed control of said one drive means.

3,913,505
STAGGERED NEEDLE CUT-PILE TUFTING MACHINE

Robert T. Crumbliss, and Jerry V. Hendricks, both of Chattanooga, Tenn., assignors to The Singer Company, New York, N.Y.

Filed Dec. 4, 1974, Ser. No. 529,417
Int. Cl.² D05C 15/00
U.S. Cl. 112—79 R 7 Claims



1. In a tufting machine for making cut-pile fabric, means for supporting a backing fabric fed from front to rear of the machine, a needle bar means carrying front and rear laterally extending spaced rows of yarn carrying needles disposed on one side of the backing fabric, the needles in the rear row being staggered relatively to the front row, means for reciprocating the needles to penetrate and insert loops of yarn through the backing fabric, a looper associated with each needle disposed on the opposite side of the backing fabric from said needles, each looper including a body portion and a loop penetrating bill angularly extending from said body portion and defining a throat therebetween, the bills of the loopers associated with the front row of needles being longer than the bills of the other loopers by substantially the spacing between the front and rear row, means for supporting the body portion of said loopers with all the throats substantially aligned laterally, means for actuating said loopers so that said bills enter respective loops of yarn presented by said needles to seize and hold the loops when the needles are withdrawn, a knife disposed on one side of each hook and having a cutting edge for cooperating with the respective blade adjacent the throat for severing loops thereon to form cut-pile, means for supporting said knives substantially aligned laterally, and means for actuating said knives in timed relation to the actuation of said loopers for movement in a path wherein said

cutting edges are moved into cutting engagement with the respective blade.

3,913,506

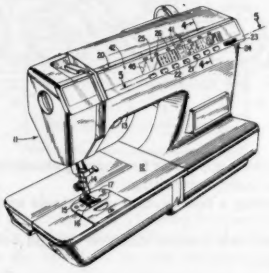
PATTERN SELECTION SYSTEM FOR SEWING MACHINES

Kenneth D. Adams, Madison; Robert C. Hauf, Upper Montclair, and Edward W. Ostapczuk, Union, all of N.J., assignors to The Singer Company, New York, N.Y.

Filed Nov. 26, 1974, Ser. No. 527,314

Int. Cl.[2] D05B *3/02*

U.S. Cl. 112—121.13 **6 Claims**



1. Stitch pattern selection means for a sewing machine having a stitch pattern controlling arrangement in which each specific one of a plurality of stitch patterns may be initiated as a result of a unique composite condition of an electrical control circuit system, said stitch pattern selection means comprising a plurality of first electrical switch means arranged on said sewing machine, first operator influenced means for selectively closing any one of said first electrical switch means for establishing a separate and distinct condition of a portion of said electrical control circuit system upon closure of each of said plurality of first electrical switch means, second electrical switch means arranged on said sewing machine and positionable selectively into a number of different discrete positions, second operator influenced means for positioning said second electrical switch means in any selected discrete position, each said different discrete position establishing a separate and distinct condition of another portion of said electrical control circuit system, and means rendered effective by each utilization of said operator influenced means for activating the electrical control circuit system to reflect the composite condition of the combination of both of said portions of said electrical control circuit system.

3,913,507

WORKPIECE GUIDE FOR SEWING MACHINE

Konrad Pollmeier, Bielefeld, Germany, assignor to Durkoppwerke GmbH, Bielefeld, Germany

Filed May 20, 1974, Ser. No. 471,645

Claims priority, application Germany, May 23, 1973, 7319362[U]

Int. Cl. D05b *35/10*

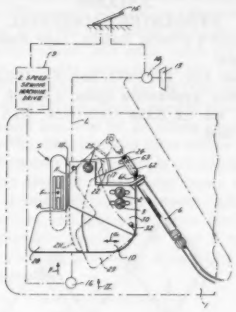
U.S. Cl. 112—153 **10 Claims**

1. A workpiece guide for a sewing machine wherein the workpiece is passed on a sewing surface along a path through a stitching station, said guide comprising:

a guide element fixed to said surface and having a guide edge extending along said path adjacent said station;

a cover plate spaced above said surface, overlying said guide element and overhanging said edge in an operative position of overlying said path to define therewith and with said edge a guide slot for said workpiece,

means pivotally mounting said cover plate for swinging movement about an upright axis relative to said guide element from said operative position into an inoperative position wherein said cover plate lies wholly outside said path to the side of said edge opposite said station; and



means for displacing said cover plate between said positions.

3,913,508

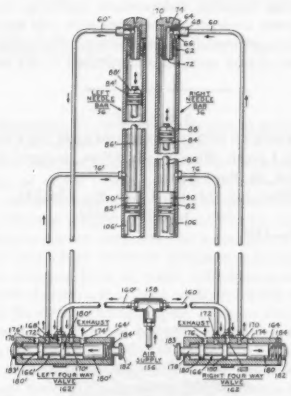
TWO-NEEDLE PNEUMATIC DISENGAGING MECHANISM

Ronald J. Boser, Dix Hills, N.Y., assignor to Special Sewing Systems, Inc., New York, N.Y.

Filed Dec. 12, 1974, Ser. No. 531,947

Int. Cl.[2] D05B *69/08*

U.S. Cl. 112—221 **6 Claims**



1. In a sewing machine designed to sew stitches in parallel spaced lines, the appratus comprising a pair of needle bar means each including a needle bar and a needle for forming stitches from a respective thread, means actuated pneumatically within each of said needle bars and connected with said needle and adapted to move said needle axially with respect to said needle bar between a first engaged position and a second disengaged position, a source of pressurized air, and a pair of valve means in communication with said source of pressurized air and said pneumatically actuated means, each of said valve means operable between first and second positions to direct air under pressure into said pneumatically actuated means, said valve means in its said first position adapted to direct air under pressure into said pneumatically actuated means so as to drive said needle into its first engaged position, said valve means in its second position adapted to direct air under pressure into said pneumatically actuated

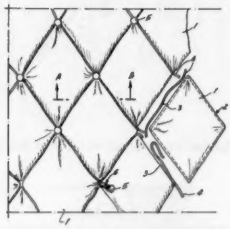
means so as to drive said needle into its second disengaged position.

3,913,509

UPHOLSTERY MATERIAL

Casimiro Manuel Carreras Ramon, calle Espronceda, no. 4, Madrid, Spain

Filed Apr. 13, 1973, Ser. No. 350,893
Claims priority, application Spain, Apr. 14, 1972, 401774
Int. Cl. B32b *3/10, 3/14, 3/16*
U.S. Cl. 112—408 **6 Claims**



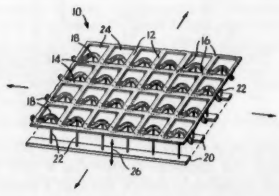
1. As a novel article of manufacture, an upholstery material for use on furniture and the like, said upholstery material comprising a plurality of identical discrete sections selected from the group consisting of leather, synthetic plastic material, and textile material; independent fastening means connecting adjacent ones of said sections with one another; and strips of piping selected from said group, interposed between adjacent ones of said sections and stitched to the same.

3,913,510

TUFTED CARPETS WITH ELASTOMERIC NET BACKING

Ronald Leslie Larsen, Minneapolis, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Filed Jan. 24, 1974, Ser. No. 436,214
Int. Cl.² D05C *17/02*
U.S. Cl. 112—410 **7 Claims**



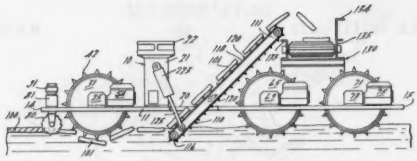
1. A tufted carpet consisting essentially of a carpet material and an elastomeric net backing material, said elastomeric net comprising a plurality of spaced sets of strands crossing each other at an angle whereby there are perforations in the elastomeric net, crossings formed by the strands of one set crossing the strands of another set forming integral joints at the crossings, wherein at least one of the sets of strands is composed of an elastomeric material having an elongation of at least 50 percent and a tensile set of less than 50 percent at that elongation, said carpet material passing through the perforations in the net and said elastomeric net helping to hold the carpet material in position.

3,913,511

NAVIGATIONAL ICE BREAKING MEANS AND VESSEL THEREFOR

Carl W. Weiland, 2980 Interlaken Drive, Orchard Lake, Mich. 48033

Filed Aug. 9, 1974, Ser. No. 496,074
Int. Cl.² B63B *35/08*
U.S. Cl. 114—42 **10 Claims**



1. Ice breaking apparatus for opening channels through ice in navigable water, comprising:

a deck having a bow portion, a port side and a starboard side,

at least two saw mounts mounted on said bow portion of said deck,

each said saw mount having a saw portion extending downwardly below said bow portion of said deck,

a shaft rotatably mounted on bearings in each said saw portion,

a circular saw blade connected to each said shaft,

power means at said saw mounts,

drive means on said saw mounts leading from said power means to said shafts to rotate said saw blades,

said rotating saws cutting the ice in conjunction with forward movement of the apparatus to reduce the resistance of the ice to breaking;

said port and starboard sides of said deck providing structure for connecting said bow portion of said deck on a vessel;

said saw blades at least scoring the ice in ribbons of substantially uniform width;

said deck having a longitudinal axis and a bow opening lying between said port and starboard sides aft of said bow portion and said saw mounts;

a drum having a cylindrical axis lying in said bow opening of said deck with said drum cylindrical axis transverse to the longitudinal axis of said deck;

said drum having a cylindrical peripheral surface and opposite end heads;

an axle lying axially in said drum and extending through said heads of said drum in opposite projecting ends;

said axle and heads being interconnected;

paired spaced bearings on said deck at said bow opening rotatably supporting said opposite ends of said axle to rotatably mount and secure said drum and said deck relative to one another;

drum drive and power means mounted on said deck and connected to one of said projecting ends of said axle to rotate said drum; and

angularly-spaced radially-extending flanges on said cylindrical peripheral surface of said drum; said flanges constituting ice engaging cleats;

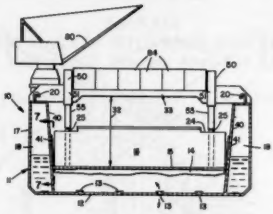
driven rotation of said drum rotating said cleats tractor-cleat-wise relative to ice to move said cleats into engagement with ice to break the ice ribbons made by said saws as said roller moves through the water in conjunction with forward motion of said apparatus,

said drum cleats breaking off the ice ribbons of relatively uniform width at a relatively uniform distance from said saw blades to break the sawed ice ribbons into chunks of substantially uniform size.

3,913,512
VESSEL FOR FLOTATION LOADING AND UNLOADING AND PARTIAL BUOYANCY SUPPORT OF BARGES AND OTHER FLOATING CARGOES

William Everett Kirby, Victoria, Hong Kong, and David Jackson Seymour, San Francisco, Calif., assignors to Wharton Shipping Corporation, Edificio Vallarino, Panama

Continuation-in-part of Ser. No. 413,968, Nov. 8, 1973, abandoned. This application Oct. 2, 1974, Ser. No. 511,492
Int. Cl. B63b *35/28*
U.S. Cl. 114—43.5 34 Claims



1. A vessel for transport of a floating buoyant cargo such as barges, lighters, and pontoons, wherein said cargo is partially supported in the vessel by its own buoyancy, including in combination:

a hull having a bottom shell with rigid submarine cargo-supporting and hull-reinforcing structure, a bow, a stern, and side walls providing a series of buoyancy compartments, and a hollow enclosed interior including a cargo hold, said shell having openings communicating with said hold for free passage of water therethrough into and out from said hold at all times, so that said hold is always flooded, means for introducing and expelling water from said buoyancy compartments to adjust the draft, trim, and list of said vessel,

gate means in said hull for opening to enable flotation loading and unloading of said floating cargo and for closing during transportation thereof, and

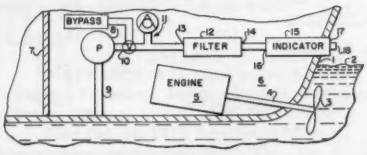
securing means for releasably locking said cargo in place in said flooded hold against movement relative to said hull all during a voyage of said vessel, with a lower portion of said cargo engaging said submarine cargo-supporting structure, said securing means including means for engaging an upper portion of said cargo,

whereby the water in the flooded hold enables the buoyancy of the cargo to support the cargo, at least in part.

3,913,513
SMALL BOAT OIL REMOVAL SYSTEM FOR BILGE WATER

Vito S. Pedone, Box 2733, Arlington, Va. 22202

Filed July 26, 1974, Ser. No. 492,168
Int. Cl.² B63B *29/16*
U.S. Cl. 114—183 R 18 Claims

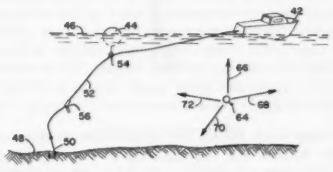


14. In combination with a small boat having an inboard engine driving an outboard propeller, with the engine being contained within a compartment collecting bilge water and oil from the engine, and bilge pump means having an inlet adjacent the lower portion of said compartment for sucking bilge water and oil through the inlet and discharging it at a higher pressure through a discharge outside of said engine compartment to the environment surrounding the small boat, the improvement comprising: filter means fluid connected between said bilge pump means and said discharge for receiving the pressurized bilge water and oil, and further for normally removing the oil from the bilge water to discharge only clean water to the environment; and relief valve means fluid connected between said bilge pump means and said filter means for passing all of the bilge water and oil from said bilge pump means to said filter means during normal operation without substantial pressure loss, and for admitting atmospheric air to the fluid connection between said filter means and said bilge pump means when ever the pressure is substantially below the normal operating pressure of said bilge pump means, so that upon starting of said bilge pump means, said bilge pump means may start-up and generally reach normal operation without back pressure produced by said filter means and anyother back pressure producing means downstream from said relief valve means.

3,913,514
BOAT ANCHOR RETRIEVING METHOD AND APPARATUS

Lester A. Reynolds, 911 Lehua Ave., Pearl City, Hawaii 96782

Filed Oct. 25, 1973, Ser. No. 409,661
Int. Cl.² B63B *21/24*
U.S. Cl. 114—206 R 19 Claims



5. An apparatus for retrieving a deployed anchor attached to a boat by an anchor line comprising

a buoyant structure, floated above the deployed anchor in a body of water, which buoyant structure exerts an upward buoyant force greater than a downward force which is a sum of a weight of the anchor and a resistive force tending to secure the anchor to a bottom of the body of water, and which buoyant structure experiences a frictional dragging force of water sufficient to maintain the buoyant structure at a fixed position on the water,

a means for slidably attaching the buoyant structure to the anchor line so that the buoyant structure is free to slide along the anchor line, and so that the frictional dragging force of the buoyant structure is sufficient to maintain the buoyant structure in a nearly fixed position in the water while the anchor line is drawn through the means for attaching the buoyant structure, and

a means for applying a drawing force on the anchor line remote from the buoyant structure, which means exerts sufficient force on the anchor line to raise the anchor from the bottom by drawing the anchor line through the means slidably attaching the buoyant structure to the anchor line;

further comprising a unidirectional detent attached to the anchor line near the anchor prior to dropping anchor, which unidirectional detent permits the means for slidably attaching the buoyant structure to slide along the anchor line toward the anchor and which unidirectional detent prevents the means for slidably attaching the buoyant structure from moving past said unidirectional detent in a reverse direction; whereby, a raised anchor is constrained to remain near the buoyant structure when the drawing force on the anchor line is terminated,

whereby, the buoyant structure and means for slidably attaching the buoyant structure to the anchor line redirect the drawing force on the anchor line so that it is applied to the deployed anchor in a generally upward direction.

3,913,515
SNAP-HOOK HOLDER

Nils Einar Hernsjö, and Rolf Edmund Melander, both of Lidingo, Sweden, assignors to Nils Einar Hernsjö, Lidingo, Sweden

Filed Oct. 24, 1973, Ser. No. 409,300
Claims priority, application Sweden, Oct. 25, 1972, 13800/72
Int. Cl.² B63B *21/00*
U.S. Cl. 114—230 **5 Claims**

1. A snap-hook holder for connection to one end of an elongated handle and having a cavity for receiving a base portion of a snap-hook therein; at least one engagement means for detachably retaining said base portion within said cavity, to facilitate application of said hook to a distant attaching member by means of said handle and the holder; the latter further comprising rigid portions forming firm abutments arranged to cooperate with selected portions of said hook to prevent any rotation of the hook in a a direction in which external forces tend to rotate the same when applying it to said attaching member; wherein said at least one engagement means includes "snap-in" means for retaining said snap-hook in engagement therewith; and wherein said at least one engagement means includes a spring loaded arm fixed at one end, and which has at its other end a stud arranged to protrude into said cavity.

3,913,516
WING TO SWIM OR TO ROW

Onofre S. Garcia, 77 Prospect St., Newark, N.J. 07105

Continuation of Ser. No. 409,277, Oct. 24, 1973, abandoned. This application Aug. 27, 1974, Ser. No. 500,921
Int. Cl.² B63H *1/32, 16/04*
U.S. Cl. 115—31 **6 Claims**

1. A pair of devices for attachment to a member to be manipulated in water to cause forces of propulsion, each device comprising

a sleeve having a first end zone and a second end zone and being characterized by a longitudinal centerline,

a plurality of equi-spaced struts each of a common length and each having a first end and a second end,

pivot means connecting the first end of each strut to the first end zone,

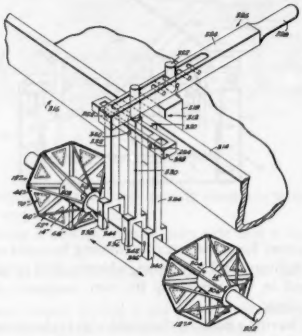
said struts being swingable from a first position of general alignment of said struts with said sleeve and a second position of said struts extending radially outwardly and rearwardly toward said second end zone,

stop means to limit swinging movement of the second end of each of said struts toward said first end zone,

said stop means defining said second position,

said second position being such that each of said struts is oriented at a substantially common angle of divergence with respect to the centerline of said sleeve and with the second ends being in a substantially common transverse plane with respect to the sleeve centerline and said second ends defining a curved line in said plane of a substantially common radius from said centerline;

a flexible canopy connected to each of said struts and spanning the space between said struts and said sleeve, and



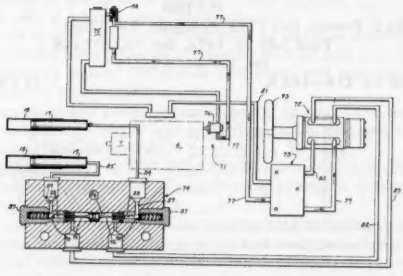
said sleeve being of an axial length greater that the distance between the first end zone and said transverse plane,

means to connect said sleeve to a member, each of said devices being in coaxial spaced relation and facing in a common direction and being characterized by said curved line of each device defining a complete circle in said transverse plane; and an elongate shaft in the sleeve of each device and said means to connect connecting said sleeve to said shaft, said shaft being pivotally connected to a force transmission means extending radially of said shaft.

3,913,517
HYDRAULIC STEERING MECHANISM FOR MARINE DRIVE

Lawrence L. Lohse, Fond du Lac, and William E. Hackbarth, St. Cloud, both of Wis., assignors to Kiekhaefer Aeromarine, Fond du Lac, Wis.

Filed Mar. 29, 1974, Ser. No. 455,997
Int. Cl.² B63H *25/42*
U.S. Cl. 115—35 **4 Claims**



1. A marine drive for boats having a dirigible unit and means for mounting the dirigible unit on a boat; hydraulic steering means for said dirigible unit and comprising a source of fluid pressure having interconnected sump and pump

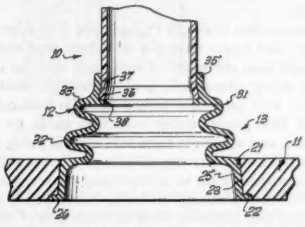
means, a double acting power cylinder means carried by said mounting means and connected to said dirigible unit to steer the same upon a generally vertical axis, an orbitrol helm connected to the sump and pump means of said power source to selectively transmit pressure fluid from said source to the power cylinder means and to return spent fluid from said cylinder means to the sump, and a locking valve having check valve in the connections between said source and said orbitrol helm to isolate the pressure fluid in said helm and power cylinder means from said sump and pump means in the event of failure of said source.

3,913,518

TRAFFIC MARKER WITH RESILIENT COLUMN

Nathan W. Kaplan, 821 Traction Ave., Los Angeles, Calif. 90013

Filed May 28, 1974, Ser. No. 473,816
Int. Cl.² E01F *9/10*
U.S. Cl. 116—63 PC **2 Claims**



1. A traffic marker which includes:

a tubular column having sufficient vertical extent, diameter, and reflectance, to be conspicuous to motorists, said column having an outwardly flared lower end;

a normally vertical holder for said column, said holder comprising:

a sleeve at the upper end of said holder for closely receiving said flared lower end of said column;

a bellows comprising a series of bellows folds below said upper sleeve, said bellows having a resilience permitting the deflection of said sleeve from the vertical axis of said holder; and

a lower end of said holder having greater horizontal extent than the diameter of said bellows, said lower end having walls diverging outwardly and downwardly, and said lower end including a peripheral shoulder at its lowermost edge; and

a base having sufficient horizontal extent and weight relative to said holder and said column to support them in a normally upright vertical position with stability, and said base being provided with an opening for receiving said lower end of said holder, said opening having upward converging interior walls to mate with the downwardly diverging walls of said lower end, and said base opening having an internal peripheral recess to accommodate said lower peripheral shoulder on said holder.

3,913,519

ADVANCE WARNING DEVICE

Saburo Sugano, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Oct. 18, 1973, Ser. No. 407,575
Claims priority, application Japan, Oct. 19, 1972, 47-120867
Int. Cl.² G08B *5/36;* **G01D** *5/32;* **G11B** *15/18;* **B65H** *25/30*
U.S. Cl. 116—114 J **7 Claims**

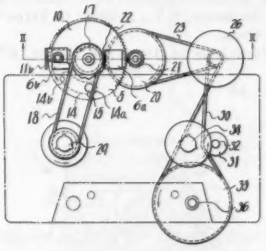
1. In a filament transport system including means for winding the filament onto a take up reel from an undriven supply reel, an advance warning device comprising:

a. a signal source,

b. a first rotatable member including means providing transmission of said signal from at least one point thereon,

c. a second rotatable member mounted for limited rotary motion relative to said first rotatable member between first and second relative positions,

d. shielding means on said second member for blocking the transmission of said signal when said members are in the first relative position,



e. means rotating one of said members at a relatively constant reference speed,

f. means rotating the other of said members at a speed reflecting the variable speed of one of said reels, and

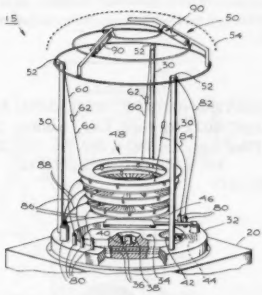
g. means providing a slip connection between one of said rotating means and its respective member whereby said members rotate relative to each other said limited amount to the second relative position to unblock the transmission of said signal when said supply reel retains only a predetermined small amount of filament thereon.

3,913,520

HIGH VACUUM DEPOSITION APPARATUS

Joseph E. Berg, and Randolph E. Brown, Jr., both of Los Angeles, Calif., assignors to Precision Thin Film Corporation, Los Angeles, Calif.

Filed Aug. 14, 1972, Ser. No. 280,489
Int. Cl.² C23C *13/12*
U.S. Cl. 118—7 **37 Claims**



1. Apparatus for depositing a film on a substrate comprising:

means for emitting molecular particles of a selected compound;

means for accelerating and directing said particles to a predetermined collector region remote from said emitting means, which collector region includes said substrate, comprising a plurality of rings encircling the path of said particles in a selected region between the emitting means and the collector region;

at least one ionizing means spatially interspersed with said plurality of rings;

means for maintaining a high vacuum within a space encompassing the emitting means, the accelerating and directing means, and the collector region; and

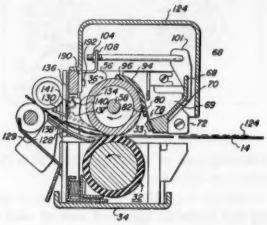
means for controlling the deposition of said film on said substrate.

3,913,521

COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER

Ari Bar-on, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 24, 1974, Ser. No. 482,675
Int. Cl.² B05C *11/04*
U.S. Cl. 118—60 **7 Claims**



1. Contact fuser apparatus for fixing toner images to support sheets, said apparatus comprising:

a heated fuser member;

a resilient backup member supported for cooperation with said heated member to pass support sheets therebetween with said toner images contacting said heated fuser member;

means for applying release material to the surface of said heated fuser member;

means for doctoring said release material applied to said heated fuser member to a predetermined thickness, said doctoring means comprising a composite structure including a flexible base member and a resilient strip, said resilient strip engaging said fuser member; and

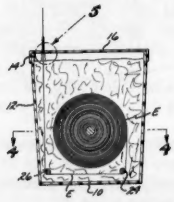
means engaging said base member for supporting said composite structure in cantilever fashion, said resilient strip being attached to said base member adjacent the free end thereof.

3,913,522

ADHESIVE AND TAPE DISPENSING DEVICE

Glenn M. Light, 4022 Howard, Los Alamitos, Calif. 90720

Filed Apr. 19, 1974, Ser. No. 462,254
Int. Cl.² B05C *3/12, 11/115*
U.S. Cl. 118—419 **3 Claims**



1. In combination with a quantity of an adhesive of paste like consistency that hardens when exposed to the atmosphere and a roll of tape to which said adhesive will adhere, said roll having a transverse opening in the center thereof, a device for storing substantially all of said adhesive out of contact with said atmosphere when said device is not in use, and said device when in use permitting a desired length of said tape to be withdrawn therefrom, with said withdrawn length being enveloped with a continuous film of said adhesive of a desired thickness, said device including:

a. a container defined by a bottom and a continuous wall that extends upwardly therefrom to terminate in a free edge, said container of such size that said roll may be disposed therein and rotated on an axis parallel to said bottom and upwardly disposed therefrom;

b. two transversely spaced and aligned tubular bosses supported from the interior surface of said sidewall a substantial distance above said bottom;

c. a rigid transverse member inside said container, said member having the ends thereof supported in said bosses, and said member extending through said opening in said roll rotatably supporting said roll thereon;

d. first and second, spaced elongate transverse guides inside said container that are adjacently disposed to said bottom and parallel to said rigid member, said first and second guides having the ends thereof rigidly secured to said side wall;

e. a cover that sealingly engages the free edge of said side wall, said cover having a slot therein of slightly greater length than the width of said tape, and the width of said slot being substantially greater than the thickness of said tape, with said tape extending from said roll thereof to said first guide, under said first guide to said second guide, and upwardly from said second guide through said slot, with said quantity of adhesive being sufficient to fill said container up to at least said bosses, said tape when withdrawn from said slot being enveloped in a continuous film of said adhesive, with the thickness of said film being determined by the width of said slot, said adhesive enveloped tape as it is withdrawn from said container being periodically severed from the balance of said tape remaining in said container, said balance of said tape having the free end portion thereof formed into an L-shaped tab that is placed in sealing contact with the exterior of the surface of said cover until additional tape from said container is again needed, said adhesive in said slot and on said tab hardening to form a plug that fills said slot and prevents air from the ambient atmosphere entering said container to harden said adhesive therein, and said ahrdened adhesive in said slot that defines said plug being easily separated from said cover by an upwardly directed force on the portion of said tape that defines said tab to permit an additional length of said adhesive enveloped tape to be withdrawn from said device and

f. a sheet that sealingly engages said cover and extends over said slot, said sheet secured to the uppermost end of said tape to prevent said end dropping downwardly into said container.

3,913,523

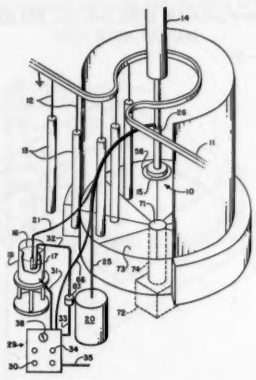
POWDER COATING APPARATUS

Richard O. Probst, Sun Valley, Calif., and Ronald R. Kendall, Indianapolis, Ind., assignors to Ransburg Electro-Coating Corporation, Indianapolis, Ind.

Division of Ser. No. 278,594, Aug. 7, 1972, which is a continutation of Ser. No. 126,621, March 22, 1971. This application Mar. 25, 1974, Ser. No. 454,406
Int. Cl.² B05B *5/02, 7/14;* B05C *11/16*
U.S. Cl. 118—626 **12 Claims**

1. A system for coating an article with powder coating material including an enclosure defining a coating zone, means for moving the article over a substantially omega-shaped path within the enclosure, and non-rotating means for distributing the powder located at the approximate center of the omega-shaped path of the article and including a chamber and an orifice for ejecting the powder from the chamber, first means to deliver a flow of powder entrained in gas to the chamber of the powder-distributing means, the powder-dis-

tributing means having a powder direction changing deflector adjacent the orifice, the side walls of the chamber including a plurality of apertures directing gas jets into the chamber to swirl the powder in the chamber and to direct it radially outward from the chamber and over the powder direction changing deflector in an expanding fashion and toward the omega-



shaped path of the article, and an opening adjacent the deflector into which gas is aspirated by the movement of the gas entrained powder from the chamber, the deflector of the powder-distributing means cooperating to combine swirling gas and aspirated gas and to move the powder toward the article.

3,913,524

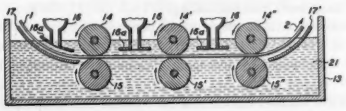
LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY

Osamu Fukushima; Masamichi Sato, and Seiji Matsumoto, all of Asaka, Japan, assignors to Rank Xerox, Ltd., London, England

Division of Ser. No. 234,154, March 13, 1972, Pat. No. 3,808,024. This application Sept. 26, 1973, Ser. No. 400,777

Int. Cl.[2] G03G *15/10*

U.S. Cl. 118—637 **8 Claims**



1. An apparatus for developing an electrostatic latent image on the surface of an image carrier, comprising a tank for containing liquid electrophoretic developer including a suspension of toner particles in an electrically insulating liquid vehicle, means for conveying said carrier through said tank, and means in said tank for removing developer having a depleted toner concentration from immediately adjacent the image surface of said carrier, said depleted toner removing means comprising a roll having a cylindrical surface and positioned adjacent the path of travel of said carrier through said tank and located to be closely adjacent the image surface of said carrier whereby depleted developer adjacent said image surface is constrained to move away from said surface, said roll having enlarged diameter flanges at its ends for engaging the image surface of said carrier, and thereby defining a fixed spacing between said cylindrical surface and said carrier image surface.

3,913,525

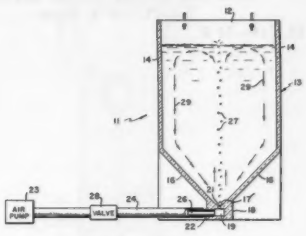
SHRIMP TANK

Frank C. Plocek, 213 Orangeburgh Road, Old Tappan, N.J. 07675

Filed July 7, 1972, Ser. No. 269,837

Int. Cl.[2] A01K *61/00*

U.S. Cl. 119—2 **4 Claims**



1. A rectangular tank for the live storage of brine shrimp comprising:

a. A tank for brine solution, the bottom of said tank being sloped from opposing sidewalls to a midline of the base of said tank;

b. A plenum chamber in the base of said tank separated from the interior thereof by said sloped bottom;

c. a plurality of passages spaced across the width of said tank on said midline thereof;

d. Means connecting said plenum chamber to a continuous source of air pressure, said air passing into said plenum chamber escaping into said passages into said tank inducing a circular water current, maintaining said shrimp in said brine solution in a moving suspension.

3,913,526

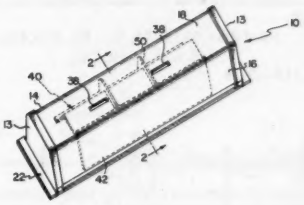
AQUARIUM COVER

Frank Kenneth Hall, Saginaw, Mich., assignor to O'Dell Manufacturing, Inc., Saginaw, Mich.

Continuation-in-part of Ser. No. 302,919, Nov. 1, 1972, Pat. No. 3,805,740. This application Jan. 11, 1974, Ser. No. 432,475

Int. Cl.[2] A01K *64/00*

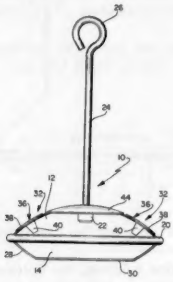
U.S. Cl. 119—5 **15 Claims**



11. An aquarium tank cover comprising an elongate shell-like cover member adapted to overlie an aquarium tank and defining a downwardly opening chamber, an elongate shell-like hood member mounted in the interior of said cover member having a portion in spaced relationship to said cover member and defining a downwardly opening light-reflecting chamber, the length of said hood being substantially less than that of said cover member, lamp mounting means mounted in the interior of said hood, vertical panel means extending between said hood and cover members defining a sealed chamber between said hood member and said cover member having a longitudinal extent substantially less than that of said hood,

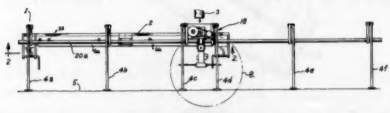
and electric component means mounted in said sealed chamber and operatively coupled to said lamp mounting means.

3,913,527
HUMMINGBIRD FEEDER
Peter Kilham, Barrington, R.I., assignor to Droll Yankees, Inc., Foster, R.I.
Filed July 1, 1974, Ser. No. 484,714
Int. Cl.² A01K *39/00*
U.S. Cl. 119—51 R **7 Claims**



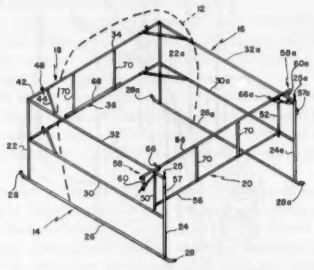
1. A hummingbird feeder comprising a reservoir having a top wall and a bottom wall, each having an outwardly extending peripheral marginal flange in alignment with and abutting each other, means securing said flanges to each other whereby said top and bottom walls define an enclosure constituting the aforesaid reservoir, a feeding station positioned in said top wall adjacent to but spaced from said marginal flange, said feeding station comprising a feed opening in said top wall, an insert member comprising a substantially flat top flange surrounding said feed opening and secured to the outer surface of said top wall, said insert member further comprising an elongated tube extending snugly through said feed opening into said reservoir, a separate filling opening in said top wall, and means for covering said filling opening, said means being movable to expose said filling opening when it is desired to fill said reservoir.

3,913,528
SELF-PROPELLED FEEDER
Donald E. Rutten, Plainfield, and Richard A. Davis, Joliet, both of Ill., assignors to P & D Manufacturing Co., Inc., Plainfield, Ill.
Filed May 28, 1974, Ser. No. 473,496
Int. Cl.² A01K *5/02*
U.S. Cl. 119—52 B **28 Claims**



1. In an animal feeder to deposit animal feed into a feed area having a guide track extending along the feed area, an elongated feed carrier mounted for movement on the guide track, said feed carrier having a trough to receive feed material and a means for removing feed from said trough comprising a continuous conveyor loop longitudinally encircling said trough and means to define a fixed point beneath said trough whereby movement of the feed carrier produces relative movement between the trough and the loop, the improvement which comprises a stationary support member extending within said feed carrier longitudinally below said trough along the entire length of the guide track and means for connecting the fixed point of said conveyor loop to said longitudinal support member to define said fixed point.

3,913,529
FEEDING PEN FOR HAYSTACKS
Richard Eugene Leigh, Jr., 1613 Medical Towers, Houston, Tex. 77025
Filed June 20, 1974, Ser. No. 481,053
Int. Cl.² A01K *5/00*
U.S. Cl. 119—60 **9 Claims**



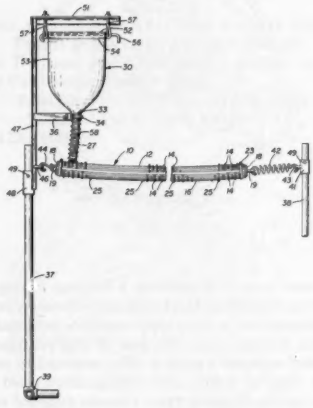
1. A feeding pen for haystacks for use by cattle and other animals including,

a. first and second opposed, skidmounted side members, each such side member including,
   i. first and second vertical bars,
   ii. a skid rail to which the first and second vertical bars (*a*) (*i*) are secured,
   iii. a first horizontal bar secured between and adjacent the top of the vertical bars (*a*) (*i*),
   iv. a second horizontal bar secured to and between the vertical bars (*a*) (*i*) and between the skid rail (*a*) (*ii*) and the first horizontal bar (*a*) (*ii*), and
   v. extensions placed above the vertical bars (*a*) (*i*) at one end of such bars,
b. a third side member including first and second horizontal bars secured to the end of each of the first and second side members (*a*) which is located opposite the extensions (*a*) (*v*) and
c. a fourth side member slideably attached to the first and second side members for sliding movement along substantially the entire length of the first and second side members and including
   i. first and second vertical bars,
   ii. a first horizontal bar secured to the top of both of the vertical bars (*c*) (*i*) and lockingly and slideably engaging the first and second side members (*a*), and
   iii. a second horizontal bar spaced below the first horizontal bar (*c*) (*ii*) and connected to the vertical bars (*c*) (*i*).

3,913,530
INSECTICIDE APPLICATOR FOR ANIMALS
A. E. Smith, R.R. 3, Smith Center, Kans. 66967
Filed June 17, 1974, Ser. No. 479,916
Int. Cl.² A01K *29/00*
U.S. Cl. 119—159 **9 Claims**

1. Applicator apparatus for applying dust type insecticide and parasite treating materials to the hair and hide of animals comprising an elongated hollow tubular structure of flexible material, fastener means provided at the ends of said applicator tube structure to facilitate extension thereof between longitudinally spaced supports in a manner providing for resilient movement of said tubular structure, a plurality of finger protrusions provided by the flexible material of said tubular structure and extending outwardly from the exterior

surface thereof, said tubular structure providing an inlet opening for the introduction of said dust type treating materials into the interior of said tubular structure and a plurality of exit openings disposed for gravity discharge of said treating materials therefrom, multiple position valve means for each of said exit openings, contact elements for each of said valve means purposefully exposed for animal contact whereby the treating materials are selectively released from an exit opening when the associated contact elements are engaged by the animal, an



elevated storage supply container for said dust material, a flexible conduit interconnecting said supply container and the applicator tubular structure for the delivery of said treating materials to said tubular structure, and a resilient component for said applicator apparatus to increase the resilient movement thereof whereby flexing movements of said tubular structure will cause a corresponding movement of said conduit to disrupt bridging of said dust type treating materials and to assure the efficient flow and dispensing thereof.

3,913,531

SEDIMENT BLOWDOWN ARRANGEMENT FOR A SHELL AND TUBE VAPOR GENERATOR

Richard Frederick von Hollen, Manchester, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed June 20, 1974, Ser. No. 481,415
Int. Cl.[2] F22B *1/06, 37/54*
U.S. Cl. 122—32 **5 Claims**

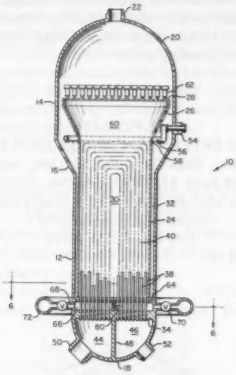
1. In a shell and tube heat exchanger for the generation of vapor by the indirect transfer of heat from a heating fluid to a secondary liquid including a pressure shell having a transverse tube sheet defining a vapor generating region enclosing a bundle of heat exchange tubes emanating from said tube sheet, means for passing heating fluid through said tubes and means for circulating said secondary liquid through said vapor generating region exteriorly of said tubes, the improvement comprising means for the removal of sediment from said vapor generating region comprising:

a. a baffle plate extending transversely of said shell in closely spaced, superposed, parallel relation to said tube sheet and defining therewith a blowdown plenum;

b. means communicating with said blowdown plenum for fluid discharge therefrom;

c. means forming through openings in said baffle plate for passing secondary liquid and entrained sediment from said vapor generating region to said blowdown plenum; and

d. said blowdown plenum containing a plurality of upstanding plates extending transversely thereof to divide said



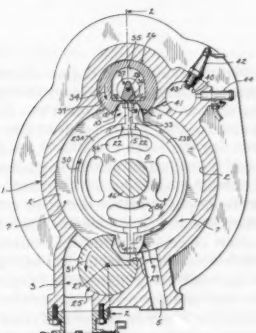
plenum into a plurality of independent sections, and means for passing fluid selectively from said sections.

3,913,532

ROTARY ENGINE

Herman C. Frentzel, Shorewood, and Thomas H. Frentzel, Whitefish Bay, both of Wis., assignors to Frentzel Development, Inc., Milwaukee, Wis.

Filed Nov. 5, 1973, Ser. No. 412,975
Int. Cl.[2] F02B *53/08*
U.S. Cl. 123—8.31 **9 Claims**



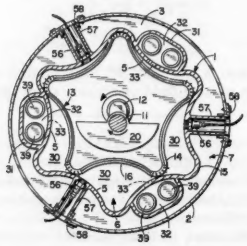
2: In a rotary engine having a main power rotor disposed within a stationary housing for rotation about a main axis and surrounded by a main chamber, a pair of lobes extending radially outward from said main axis and into engagement with the main chamber walls, and a combustion control rotor mounted to said housing for rotation about a second axis parallel to said main axis, said combustion control rotor including a recess which receives each of said lobes during engine operation and a combustion control chamber formed therein and connected with said recess by a passage, the improvement therein comprising:

an inlet passage formed in said housing and wrapping around the exterior surface of said combustion control rotor over a substantial portion of its circumference to couple the main chamber with said passage in said com-

bustion control rotor over a preset portion of its operating cycle; and

a combustion control valve mounted to said housing and positioned within said combustion control chamber, said combustion control valve including a curved sealing surface which blocks said passage during a preset portion of the engine operating cycle.

3,913,533
ROTARY INTERNAL COMBUSTION ENGINE
James B. Meaden, 3009 Norwood, Slayton, Minn. 56172
Filed June 14, 1973, Ser. No. 369,997
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F02B *55/14*
U.S. Cl. 123—8.45 **1 Claim**



1. A rotary internal combustion engine comprising:

a. housing means including an internally toothed gear member having an even number of teeth and end wall members connected to the opposite ends of said gear member and cooperating therewith to define a rotor chamber;

b. a crank shaft journaled in said housing means on the axis of said internally toothed gear member and having a crank portion disposed within said rotor chamber;

c. an externally toothed rotor member journaled on said crank portion coaxially therewith, said rotor member having one less number of teeth than said gear member, said rotor member being disposed for rotary movement on its own axis and for orbital movement in said rotor chamber with the common axis of said rotor member and crank portion describing an orbit about the axis of said crank shaft;

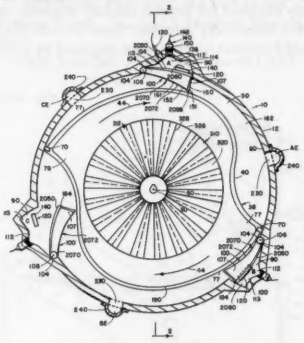
d. the teeth of said rotor member moving successively into and out of meshing engagement with the internal teeth of said gear member and having sliding engagement with said internal teeth when out of meshing engagement therewith to define therewith alternately expanding and contracting compartments responsive to said rotary and orbital movement of the rotor;

e. alternate ones of said internal teeth having openings therein for entry of gaseous fuel to said compartments and for exhaust of gases of combustion from said compartments;

f. valve means controlling intake flow of gaseous fuel to said compartments and exhaust flow of gases of combustion therefrom; and,

g. igniter means mounted in said internal teeth alternately between the teeth containing said openings for igniting gases of combustion in said compartments.

3,913,534
ROTARY ENGINE
Winfred A. Bratten, Brady, Nebr. 69123
Filed Mar. 1, 1974, Ser. No. 447,348
Int. Cl.² F02B *53/06, 53/08*
U.S. Cl. 123—8.49 **20 Claims**



1. A rotary engine comprising a housing having a rotor cavity having sidewall surfaces lying approximately on a cylindrical configuration, a drive shaft rotatably mounted on said housing for rotation about the axis of said configuration, a power rotor assembly having a rotor attached to said drive shaft and rotating within said configuration, said housing having a plurality of power valve recesses disposed extending outwardly from said axis into said sidewall, a plurality of power valve assemblies each having a power valve, said power valves each having one end hinged to said housing for swinging about a straight valve hinge line parallel to said sxis, said power valve assemblies being disposed one at each of said power valve recesses, each power valve assembly closing the entrance to its respective power valve recess to compress gases in its recess as the other end of each power valve moves away from said axis, firing chambers each disposed in communication with a certain portion of one of said power valve recesses which certain portion is farthest outward from said axis, each power valve recess and each firing chamber comprising a recess assembly, fuel and air supply means delivering fuel and air to said recess assemblies at times when the respective power valves are closing their recesses, said fuel and air delivery means delivering fuel and air to said recess assemblies in quantity for providing combustible mixtures, said fuel and air delivery to said valves being intermittent and sequential and following the closing of each respective recess assembly by its respective power valve, said rotor assembly having a surface with protrusion assemblies thereon extending outwardly from said axis, as said rotor assembly turns said protrusion assemblies sequentially pressing said power valves outwardly away from said axis by engaging the axis sides of said power valves whereby outward movement of each of said power valves causes gas compression in the respective power valve recess and in the respective firing chamber, ignition of gases in said firing chambers forcing said other ends of said power valves toward said axis sufficiently to cause said power valves to sequentially open the respective power valve recesses to said rotor cavity allowing the force of explosions in said firing chambers to engage the rearward sides of said rotor protrusion assemblies forcing forward rotation of said rotor assembly, said rotor assembly being so shaped as to permit said power valves to move toward said axis at times for permitting escape of explosion force into said cavity as described, exhaust means comprising exhaust ports in the walls of said rotor cavity disposed between each two adjacent power valves and exhausting combustion gases from said rotor cavity after a respective rotor protrusion assembly has passed the respective exhaust port, said power valves being so shaped and

positioned with respect to said rotor assembly that movements of the power valves into said recesses which are resultant from pressure from said rotor assembly cause the recess side of each power valve to reduce the volume of the space between the recessfacing side of the respective power valve and those wall portions of the respective recess which latter portions are disposed inwardly of the respective recess from the recessfacing side of the respective power valve, such volume reduction being by a certain substantial amount, said amount being at least 20%.

3,913,535

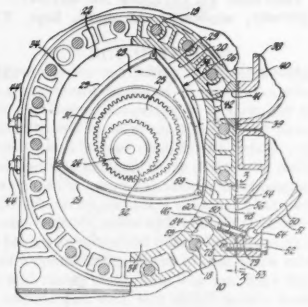
INTERNAL COMBUSTION ROTARY ENGINE OXIDIZING FLUID INJECTION ARRANGEMENT

Raymond J. Green, Northville, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 17, 1973, Ser. No. 389,112

Int. Cl.² F02B *53/00*; **F01N** *3/10*

U.S. Cl. 123—8.45 **3 Claims**



1. An internal combustion rotary engine having a stationary body comprising a rotor housing having a multi-lobed internal peripheral wall and a pair of end wall housings having oppositely facing internal end walls cooperatively defining a cavity, a crankshaft rotatably mounted in said stationary body having an eccentric located in said cavity, a multi-apex rotor rotatably mounted on said eccentric having sides opposite said end walls and a plurality of peripheral faces opposite said peripheral wall, means for causing said rotor and said crankshaft to turn in a fixed speed relationship while said rotor planetates with a fixed relationship to said rotor housing, said rotor faces and housing walls cooperating to provide a plurality of working chambers that are spaced about and move with said rotor within said rotor housing while varying in volume as said rotor planetates, said stationary body having an intake passage that is opened by said rotor to said chambers as they expand to deliver gas thereto, said rotor housing having an internal exhaust passage wall defining an exhaust passage that at one end is opened by said rotor to said chambers during their contraction to receive exhaust gas therefrom and at the other end terminates at an external interface on said rotor housing, an exhaust manifold secured to said stationary body with an interface opposite said rotor housing interface, said exhaust manifold having a manifold passage registering with said exhaust passage in said rotor housing, an oxidizing fluid passage in said exhaust manifold for receiving oxidizing fluid under pressure, said internal exhaust passage wall having a recessed elongated wall portion defining an elongated recess extending through said rotor housing interface from an open outer end at said other end of said exhaust passage to a closed inner end at an intermediate point along the length of said exhaust passage, an elongated injection nozzle secured to said exhaust manifold in a position on said exhaust manifold interface so as to project past said rotor housing interface and be fully received along its length in said elongated recess without projecting into either said exhaust passage or said manifold passage, said injection nozzle open at one end in said exhaust manifold to receive oxidizing fluid from said oxidizing fluid passage and at the other end open to said closed inner end of said elongated recess, and said recessed elongated wall portion at said closed inner end having a curved section opposite said other end of said injection nozzle for directing oxidizing fluid from said injection nozzle into said exhaust passage in a direction transverse thereto whereby said injection nozzle is located out of the path of the exhaust gas and does not experience the full heat thereof.

3,913,536

FUEL INJECTION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

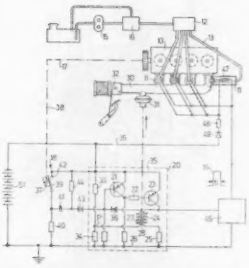
Egon Lüpple, Kornwestheim, and Peter Schmidt, Schwieberdinger, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 31, 1973, Ser. No. 393,683

Claims priority, application Germany, Sept. 1, 1972, 2243052

Int. Cl.² F02M *51/00*

U.S. Cl. 123—32 EA **14 Claims**



1. In the fuel-injection system of an internal combustion engine comprised of at least one engine cylinder, a piston movable in said cylinder, and an engine crankshaft coupled to said piston, in combination, electromagnetically actuated valve means comprising a magnetizing winding, said valve means having an open state and a closed state and being operative in said open state for injecting fuel into said engine cylinder; first current source means operative for establishing a flow of a first current through said magnetizing winding at a time synchronized with crankshaft rotation and for a time interval varying in dependence upon at least one variable engine operating condition, to cause said valve means to assume one of said states upon initiation of the flow of said first current and to cause said valve means to assume the other of said states upon termination of the flow of said first current; and second current source means operative during the time of transition of said valve means from one of said states to the other of said states for establishing during such transition the flow of a second current through said magnetizing winding in the form of a current pulse, in order to quicken such transition, wherein said first current source means comprises means for establishing said flow of said first current through said magnetizing winding in a first direction, and wherein said second current source means comprises energy-storing inductor means, first energy-storing capacitor means, second energy-storing capacitor means, means for periodically establishing a flow of current through said inductor means, means for periodically interrupting the flow of current through said inductor means to induce thereacross a voltage surge, means connecting said inductor means to said first and second capacitor means for charging said first and second capacitor means, means connecting said first capacitor means to said magnetizing winding and operative for establishing said flow of said second current through said magnetizing winding in said first

direction during the transition of said valve means associated with commencement of flow of said first current by discharging said first capacitor means through said magnetizing winding in said first direction, and means connecting said second capacitor means to said magnetizing winding and operative for establishing said flow of said second current through said magnetizing winding in opposite second direction during the transition of said valve means associated with termination of flow of said first current by discharging said second capacitor means through said magnetizing winding in said second direction.

3,913,537

ELECTROMECHANICALLY CONTROLLED FUEL INJECTION VALVE FOR INTERNAL COMBUSTION ENGINES

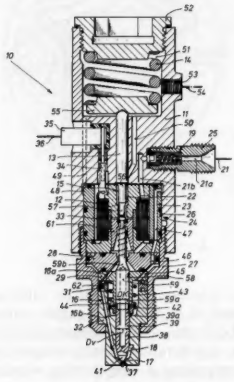
Kurt Ziesche, Neckarrems, and Günter Kulke, Esslingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 20, 1974, Ser. No. 499,055

Claims priority, application Germany, Aug. 21, 1973, 2342109

Int. Cl.[2] B05B 1/30; F02M 41/16; F22B 1/02

U.S. Cl. 123—32 AE **7 Claims**



1. In an electromechanically controlled fuel injection valve for internal combustion engines, especially Diesel engines, including a valve housing, an electromechanical converter, especially an electromagnet, mounted within said housing for controlling the onset of fuel injection, means forming part of the housing and defining a valve seat communicating with at least one nozzle orifice and a fuel pressure chamber located near the valve seat, a valve spring, a valve needle sealingly guided within the valve housing and loaded by the valve spring for closing off the valve seat, and a fuel accumulation system, the fuel accumulation system including means defining an accumulation space, a displaceably mounted accumulation plunger, elastically yielding means for controlling the displacement of the accumulation plunger, and a fuel supply line connected to a fuel metering pump and to the fuel pressure chamber wherein the accumulation space communicates with the fuel supply line and with the fuel pressure chamber, the improvement comprising:

a force equalizer piston;

means defining a bore within the valve housing within which said equalizer piston is sealingly and displaceably disposed coaxially with said valve needle, and in positive operational connection therewith; and

an actuating member responsive to the energization of the electromagnet and in positive operational connection with said force equalizer piston;

whereby the accumulation plunger and the elastically yielding means are disposed with the valve housing;

whereby said valve needle and said force equalizer piston are so dimensioned that, when said valve seat is obturated, the hydraulic force acting on said valve needle tending to open said valve seat is at least approximately equal to the force acting on said valve needle tending to obturate said valve seat and

whereby the force acting on said valve needle tending to obturate said valve may be augmented by a force exerted mediately by said accumulation plunger on said valve needle.

3,913,538

HYDRAULIC VALVE-PLAY COMPENSATING ELEMENT FOR INTERNAL COMBUSTION ENGINES

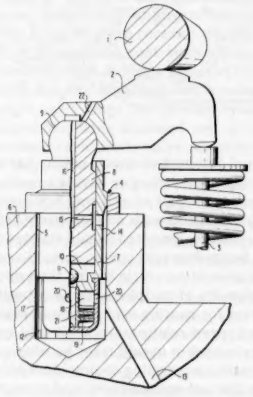
Erich Ableitner, Hochberg, and Burkhard Ott, Stuttgart, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Sept. 27, 1973, Ser. No. 401,547

Claims priority, application Germany, Sept. 27, 1972, 2247459

Int. Cl.[2] F01L 1/18

U.S. Cl. 123—90.46 **36 Claims**



1. A hydraulic valve play compensating element for an internal combustion engine, the compensating element includes two members longitudinally displaceable relative to one another, which members enclose therebetween a pressure space separated by a check valve means from a supply space, characterized in that a lubricating oil circulatory system is provided, the supply space is operatively connected with the lubricating oil circulatory system, a separate oil receiving space communicating with said check valve means is provided in said supply space, bore means are provided for communicating said supply space with said separate oil receiving space, and in that a defoaming means is arranged in said separate oil receiving space for defoaming the oil flowing into said pressure space.

3,913,539

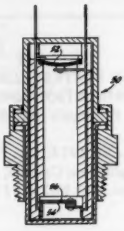
THERMO SWITCH ARRANGEMENT FOR CONTROL OF AN INTERNAL COMBUSTION ENGINE

Jerry H. Winkley, St. Louis, Mo., assignor to ACF Industries, Incorporated, St. Louis, Mo.

Division of Ser. No. 245,759, April 20, 1972, Pat. No. 3,800,767. This application Oct. 4, 1973, Ser. No. 403,505

Int. Cl.[2] F02D *11/08;* **F02M** *1/10, 23/04*

U.S. Cl. 123—117 A **1 Claim**



1. Apparatus for controlling the vacuum responsive spark advance and retard means of an internal combustion engine ignition distributor, comprising a vacuum line from a source of vacuum to said vacuum spark and retard means, a solenoid valve interposed in said vacuum line between said source of vacuum and said vacuum spark and retard means, said solenoid valve also in communication with atmospheric pressure, an electrical circuit including a source of current and switch means connected in series with said solenoid valve, said switch means having an elongated casing for mounting said casing in a wall of a container subjected to heat of the said engine, one end of said casing within said wall and the other end of said casing outside said wall, said switch means further including parallel first and second temperature responsive switches, said first temperature responsive switch located inside said casing and outside said wall and responsive to ambient temperature to open above a preselected temperature, said second temperature responsive switch located inside said casing and inside said wall and responsive to engine temperature to close above a preselected temperature, whereby said solenoid valve is energized to apply vacuum to said vacuum spark advance and retard means whenever one of said temperature responsive switches is closed to thereby advance the spark of said ignition distributor and whereby said solenoid valve is de-energized whenever both of said temperature responsive switches are open to thereby communicate said atmospheric pressure with said vacuum spark advance and retard means and thereby retard the spark of said ignitition distributor.

3,913,540

ANTIPOLLUTION APPARATUS FOR MOTOR VEHICLE ENGINES

Mikio Hayashi, Tokyo, Japan, assignor to Hayashi Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1974, Ser. No. 440,258

Claims priority, application Japan, Feb. 9, 1973, 48-15693

Int. Cl.[2] F02P *5/04*

U.S. Cl. 123—117 A **7 Claims**

1. In combination with an ignition advancing mechanism of a motor vehicle gasoline engine comprising a casing, a diaphragm dividing the interior of said casing into a vacuum chamber and an atmospheric pressure chamber, and an actuating rod having one end coupled to said diaphragm and the other end projecting out of said casing via said atmospheric pressure chamber, said actuating rod being adapted to cause the distributor of the motor vehicle engine to advance the ignition timing in response to a variable degree of vacuum created in said vacuum chamber, an antipollution apparatus comprising:

a housing substantially in the shape of a hollow cylinder;

a pair of spaced-apart diaphragms within said housing pressure-tightly dividing the interior thereof into:

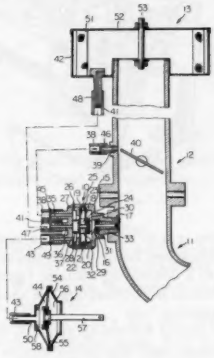
a first chamber adjacent one end of said housing which communicates with the interior of the intake manifold of the motor vehicle engine;

a second chamber intermediate both ends of said housing which communicates with the atmosphere; and

a third chamber adjacent the other end of said housing;

means interconnecting said pair of diaphragms in spaced-apart relationship;

partition means fixedly mounted in said third chamber and pressure-tightly subdividing the same into first and second sections, said partition means being normally held in pressure-tight contact with one of said pair of diaphragms to hold said first and second sections out of communication from each other;



means communicating said first section of said third chamber with the interior of the carburetor of the motor vehicle engine at a point adjacent its throttle valve;

means further communicating said first section of said third chamber with said vacuum chamber of said ignition advancing mechanism; and

means communicating said second section of said third chamber with the atmosphere;

whereby when a prescribed degree of vacuum builds up within said intake manifold during operation of the motor vehicle engine, said pair of diaphragms are caused to deflect simultaneously by suction exerted through said first chamber, thereby intercommunicating said first and second sections of said third chamber and hence nullifying the ignition advance which has been caused by said ignition advancing mechanism.

3,913,541

SELF-MODULATING AIR BLEED APPARATUS AND METHOD FOR INTERNAL COMBUSTION ENGINE

Milford M. Scott, Jr., Oak View, Calif., assignor to STP Corporation, Fort Lauderdale, Fla.

Filed Feb. 8, 1974, Ser. No. 440,768

Int. Cl.[2] F02M *23/04*

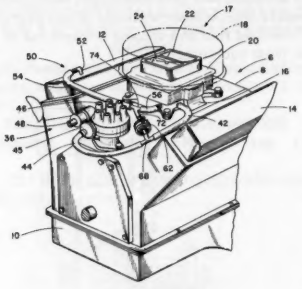
U.S. Cl. 123—119 D **11 Claims**

1. In an internal combusion engine comprising a carburetor throat for producing a fuel-air mixture, an intake chamber maintained at a partial vacuum by the engine, a throttle valve located between the carburetor throat and the intake chamber, a spark distributor including a vacuum-controlled spark advance unit, a spark advance control port in the carburetor throat adjacent the throttle valve, a first conduit for connecting the spark advance unit to the control port, and a second conduit connected to the intake chamber, improved apparatus for automatically regulating the amount of air admitted into

the intake chamber in response to varying engine load conditions comprising in combination:

a valve body for defining a first chamber, a second chamber and a valve seat, first channel means for continuously admitting air into the second conduit, means for manually adjusting the size of the first channel means in order to regulate the amount of air flowing into the intake chamber through the first channel means, second channel means for admitting air into the second conduit,

separation means for cooperating with the valve seat to separate the first chamber, the second chamber and second channel means, said separation means being moved



from the valve seat in response to an increasing vacuum signal differential and being moved toward the valve seat in response to a decreasing vacuum signal differential,

third conduit means for connecting the second chamber to the second conduit, and

fourth conduit means for connecting the first chamber to the first conduit, said separation means being movable away from the valve seat to permit air flow into the second chamber via the second channel means when the vacuum signal differential increases, whereby in operation, the combustion of the fuel-air mixture is improved and exhaust emissions are reduced.

3,913,542

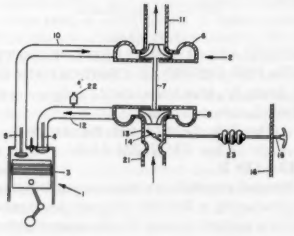
SIMPLIFIED TURBO CHARGER SYSTEM FOR AIRCRAFT

Paul M. Uitti, Huntington Beach, and William H. Mastin, Jr., Long Beach, both of Calif., assignors to Rajay Industries, Inc., Long Beach, Calif.

Continuation of Ser. No. 335,167, Feb. 23, 1973, abandoned. This application Sept. 16, 1974, Ser. No. 506,575

Int. Cl.² F02B *33/44*

U.S. Cl. 123—119 C **4 Claims**



1. A method of operating a turbocharged aircraft engine at all altitudes comprising the steps of;

a. mismatching a turbocharger to an aircraft engine so that said turbocharger can overpressurize an inlet manifold of said aircraft engine at lower altitudes;

b. discharging all of the exhaust gases from said aircraft engine through a turbine of said turbocharger; and

c. throttling an inlet of a directly coupled centrifugal compressor of said turbocharger, said throttling controlling gross delivery to said inlet manifold of said aircraft engine to thereby maintain a preselected manifold pressure for maximum efficiency of operation, said throttling being toward the closed position at lower altitudes and toward the open position at higher altitudes.

3,913,543

FUEL HEATING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

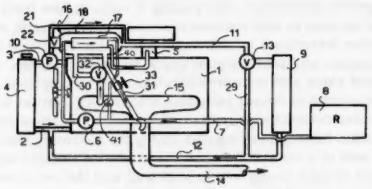
Henri Richard, 809 Principale St., St. Thomas de Joliette, Quebec, Canada

Filed Feb. 20, 1974, Ser. No. 444,157

Claims priority, application Canada, Mar. 14, 1973, 166041

Int. Cl.² F02M *31/00*

U.S. Cl. 123—122 H **5 Claims**

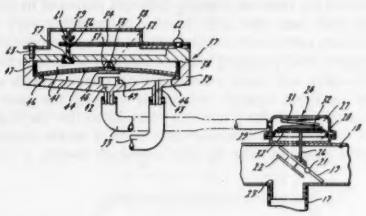


1. A fuel heating system for an internal combustion engine comprising a heat exchanger consisting of a fuel chamber and of a heated fluid chamber in heat exchange relation, said fuel chamber having a fuel inlet and a fuel outlet series-connected in the fuel line of an internal combustion engine, said heated fluid chamber having a fluid inlet and a fluid outlet series-connected in an engine heated fluid line connected to an engine for passage of said engine heated fluid therethrough, a fluid bypass line operatively communicating said fluid inlet to said fluid outlet to bypass said heat exchanger, and a thermostatic valve series-connected with said fluid inlet and responsive to the temperature of said engine heated fluid to control the flow of the latter through said heated fluid chamber and through said fluid bypass line, said thermostatic valve including a valve body serially arranged in said fluid inlet and having a pair of valve seats serially arranged in said valve body, a valve member displaceably mounted in said valve body between said valve seats for abutment with either of said valve seats, a heat responsive element located in said valve body to be responsive to the heat of the fluid passing through said valve body, said heat responsive element connected to said valve member to displace the latter into abutment with either of said valve seats in response to the temperature of said fluid, said valve member closing the fluid inlet to the heated fluid chamber below a minimum temperature of the fluid and above a maximum temperature of the fluid, and said valve member opening the inlet when the temperature of said fluid is between said minimum and said maximum temperature, and said bypass line being connected to said valve body upstream of said valve seats and in constant communication with the engine heated fluid line.

3,913,544
INDUCTION AIR TEMPERATURE CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Vincent L. Fyie, Ferndale, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 26, 1974, Ser. No. 536,699
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 D **8 Claims**



1. Apparatus to regulate the intake air temperature of an internal combustion engine,

said engine including an intake manifold and a carburetor in communication with said intake manifold,

said apparatus including first and second air inlet conduits, said first conduit opening to a source of ambient air, said second conduit opening to a source of heated air, means communicating each said conduit with said carburetor, valve means movable to open and close said first and second conduits so as to provide said carburetor with heated air or ambient air or a mixture of heated and ambient air, a vacuum motor connected to said valve means to move said valve means in response to a vacuum signal,

a vacuum passage communicating said vacuum motor and a source of intake manifold vacuum,

vacuum signal modulator means including a housing forming a portion of said vacuum passage, a first thermostatic valve means positioned within said housing constructed to open and close said vacuum passage, an orifice formed in said housing communicating said vacuum passage and a source of substantially atmospheric pressure, a second thermostatic member including a valve element cooperating with said orifice to progressively open and close said orifice, said first thermostatic valve means positioned between said orifice and said vacuum motor.

3,913,545
EVAPORATIVE EMISSION SYSTEM

Lawrence H. Haase, Belleville, and David R. Liimatta, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 4, 1973, Ser. No. 347,959
Int. Cl.² F02M *25/08*
U.S. Cl. 123—136 **4 Claims**

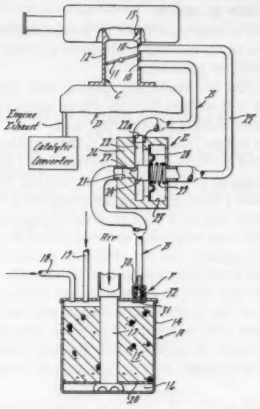
1. In an internal combustion engine having a fuel system, an intake manifold and a carburetor with a throttle to provide a gaseous mixture engine flow, an apparatus for controlling the recovery of fuel vapors in said system, comprising:

a. means for adsorbing and storing said fuel vapors,

b. a passage for purging said stored fuel vapors and for conveying said vapors to said intake manifold,

c. a first control means responsive to vacuum upstream from said throttle for maintaining said passage in either a fully opened or a fully closed condition, said passage having internal walls defining an aperture between said first control means and said means for absorbing vapors and through which flow must pass in said passage, and

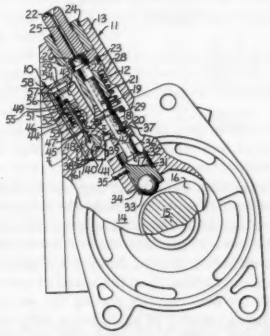
d. a second control means responsive to vacuum in said intake manifold for regulating the aperture of said passage whereby said storing means is desorbed at a rate inversely proportional to engine flow.



3,913,546
HORSEPOWER LIMITER AND OVERFUELING CONTROL MECHANISM

Jerry A. Clouse, Washington, Ill., assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed Dec. 18, 1972, Ser. No. 316,239
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F02D *1/06*
U.S. Cl. 123—139 ST **6 Claims**



6. A horsepower limiter and overfueling control mechaniam, for an internal combustion engine having a fuel pump and a fuel control device operatively associated therewith for regulating the horsepower output of the engine, comprising;

a stop surface formed on such fuel control device;

a housing having a first cylindrical bore disposed adjacent to the fuel control device, and a second cylindrical bore disposed coaxial with said first bore and terminating in an annular shoulder;

an elongated movable rod slidably disposed in said first bore having opposite ends;

a reciprocatable piston slidably disposed in said second bore and operatively attached to said movable rod for moving it between a first position in non-interferring relation to said stop surface and a second positively located position

in which one of said ends is adapted for selective direct engagement with said stop surface, said second position being established by engagement between said piston and said annular shoulder;

a source of pressurized fluid in communication with said second bore for moving said piston and said movable rod to said second position;

biasing means for resiliently urging said piston and said movable rod to said first position when said source of pressurized fluid is interrupted; and

adjustment means intergral with said movable rod including a threaded portion formed on the other of said ends of said elongated rod and screw-threadably received coaxially by said piston for adjustably attaching said elongated rod to said piston, a tool receiving notch formed in said piston and tool receiving means formed in said other end of said elongated rod for effecting rotation of said elongated rod relative to said piston to vary the disposition of said one end of said elongated rod relative to said stop surface on the fuel control device and said piston when said piston is in said second position for selectively varying the range of operation of the fuel control device to vary the maximum horsepower output of the engine.

3,913,547

FUEL CONTROL SYSTEMS

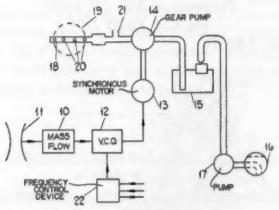
Philip Rossell Wentworth, Birmingham, and John Anthony Jeyes, Solihull, both of England, assignors to The Lucas Electrical Company Ltd., Birmingham, England

Filed Feb. 19, 1974, Ser. No. 443,842

Claims priority, application United Kingdom, Feb. 20, 1973, 8216/73

Int. Cl.² F02M *51/00*

U.S. Cl. 123—139 E **7 Claims**



1. In a fuel control system for an engine of a vehicle having an induction manifold, the improvement comprising a mass flow measuring device for producing a continuous electrical signal representative of the mass flow of air in the induction manifold of a vehicle engine, a pump for feeding fuel to the engine at a rate dependent upon the speed of operation of the pump, a motor for continuously driving the pump, the speed of the motor being variable in accordance with said electrical signal, said motor being a synchronous a.c. motor, and a variable frequency oscillator connected to said mass flow measuring device and to said motor to drive the latter, said oscillator having a frequency which is determined by said continuous electrical signal.

3,913,548

FUEL INJECTION ENGINE

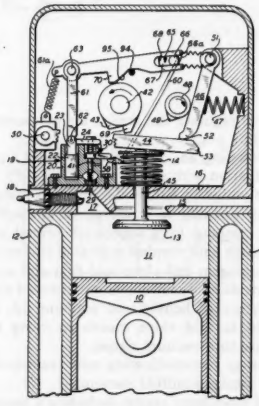
Ora E. Wilson, 3906 Holly Drive, West, Holiday, Fla. 33589

Filed June 11, 1974, Ser. No. 478,319

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 AY **5 Claims**

1. In a four cycle, fuel injection, reciprocating piston, internal combustion engine, camshaft means operating in fixed relation to the operating speed of the engine, injection timing means for timing the injection of a combustible fuel charge into the engine's combustion chamber, said injection timing means comprising pumping means for forcing said fuel charge into said combustion chamber, a pump-actuating cam lobe on said camshaft means, cam following means coacting with said cam lobe to cause reciprocation of said cam following means with respect to said camshaft means, connecting means between said cam following means and said pumping means for communicating said reciprocation to said pumping means, and manually operably control means for shifting said cam following means to move a cam engaging portion of the latter means to and fro between radially different points of its coaction with said cam lobe and thereby controllably vary the timing of such fuel injection relatively to the cyclic operation of the engine; said pumping means including a spring-closed air intake valve and valve control means coacting with said manually operable control means for varying the time of closing of said air intake valve in relation to the varying of timing of the fuel injection; said valve control means comprising a valve opening lobe on said camshaft means, a valve



opening arm coacting between the latter lobe and the air intake valve to open the latter, a pivotal locking arm spring-pressed into locking interference with said valve opening arm to hold the latter in valve opening position; secondary camshaft means, intermeshing spiral gears coacting between the two said camshaft means to effect driving of the secondary camshaft means by the other camshaft means, said spiral gear of the secondary camshaft means being slidable axially relatively to the latter to vary the angular relationships of the two said gears, a cam lobe on said secondary camshaft means, engageable with said locking arm to move the latter clear of such locking interference whereby to permit said valve to close; and a yoke portion of said manually operable means in engagement with said slideable gear to effect sliding thereof; the sliding movement of the latter gear by said yoke being proportionate to the mentioned to and-fro movement of said cam following means, whereby to coordinate the timing of operation of said pumping means with the timing of closing of said valve.

3,913,549

INDUCTOR CURRENT RELAY SWITCH

Peter G. Crisafulli, Hollywood, Fla., assignor to V-8 Electronic Ignition Co., Totowa, N.J.

Filed Sept. 20, 1973, Ser. No. 399,221The portion of the term of this patent subsequent to June 5, 1990, has been disclaimed.

Int. Cl.² F02P *1/00*

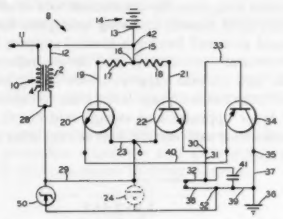
U.S. Cl. 123—148 E **5 Claims**

1. An inductor relay switch ignition system for an internal combustion engine, comprising in combination:

a primary coil forming part of an ignition coil for said system;

a source of D.C. potential having one side thereof connected to one side of said primary coil, and the other side thereof grounded;

a pair of parallel transistor-switched conducting paths connecting the second side of said primary coil to ground, said first path including the ignition breaker points of said



ignition system, and said second path being of lower impedance than said first path;

said second conductive path being enabled by current flowing through said first path, thereby providing a relay action and a relatively low impedance path to ground shunting said breaker points; and

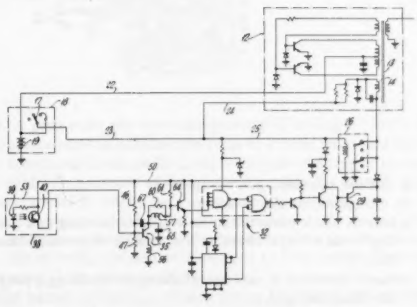
a potential limiting means connected between said second side of said primary coil and ground to prevent inductive kick back from damaging said transistors.

3,913,550

IGNITION SYSTEM EMPLOYING CONTROLLED-DURATION CONTINUOUS-WAVE HIGH-REQUENCY SPARK ENERGY

Robert E. Canup, Chester, Va., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 11, 1974, Ser. No. 460,243
Int. Cl.² H05B *37/02*
U.S. Cl. 123—148 E **13 Claims**



1. In combination with an internal combustion engine, an ignition system wherein said system employs controlled-duration continuous-wave high-frequency spark energy,

said spark energy being generated by an oscillator having an output transformer and having a control winding thereon for starting and stopping oscillation of said oscillator at the beginning and end of each spark interval,

electronic switch means connected in series with said control winding for breaking and making a loading circuit which includes said control winding,

said spark intervals being determined by photoelectric engine-timed means including a phototransistor,

said electronic switch means having a control circuit therefor including said photoelectric engine-timed means,

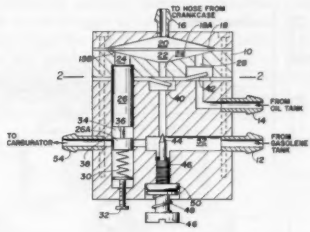
circuit means for connecting said phototransistor in a common-collector configuration relative to said control circuit for minimizing the response time of said phototransistor.

3,913,551

PROTECTION DEVICE FOR ENGINE OPERATING ON GAS-OIL MIXTURE

Douglas W. Shaver, Brantford, Canada, assignor to Raymond Lee Organization, Inc., a part interest

Filed Jan. 4, 1974, Ser. No. 430,905
Int. Cl.² F02B *77/00*
U.S. Cl. 123—198 DB **3 Claims**



1. In combination with an internal combustion engine having an oil filled crankcase and carburetor, a device for mixing oil and gasoline together, said device cutting off the flow of the mixture to the carburetor when the mixture contains no oil to protect the engines from damage, said device comprising:

an oil feed channel for receiving oil under pressure;

a gasoline feed channel for receiving gasoline under pressure;

a mixing chamber wherein oil and gas are mixed, said chamber communicating with the oil feed channel and the gasoline feed channel;

conduit means for feeding the mixture from the chamber to the carburetor;

a crankcase feed channel receiving oil that circulates in the crankcase; and

pressure sensitive means coupled both to the crankcase feed channel and the oil feed channel and connected to the conduit means, said pressure means permitting said mixture to flow to the carburetor whenever a preselected relationship is established between the pressure of oil in the crankcase and the pressure of oil in the oil feed channel, said pressure means blocking said mixture flow whenever these pressures lack said preselected relationship.

3,913,552

DEVICE HAVING TILTABLE AND ROTATABLE COACTING WHEELS FOR PROJECTING TENNIS BALLS

Alfredo S. Yarur, 2101 Yorkgate Drive; Alfredo F. Yarur, 4513 Edwards Mill Road, and Nicolas J. Yarur, 2101 Yorkgate Drive, all of Raleigh, N.C.

Filed July 1, 1974, Ser. No. 484,605
Int. Cl.² F41B *3/04*
U.S. Cl. 124—1 **5 Claims**

1. A ball projecting machine for ejecting tennis balls, and the like, of a selected substantially uniform compressible type comprising, in combination:

a. a machine supporting frame;

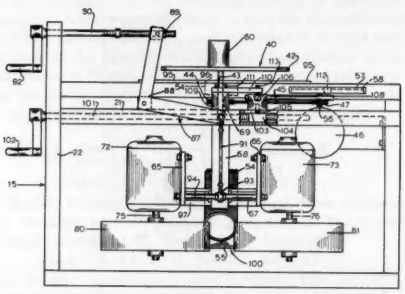
b. a vertical post means having an upper end rotatably supported by said frame for rotative swinging about a fixed vertical axis;

c. a pair of motor mounts mounted on said post means at the lower end thereof and on opposite sides thereof, said post

means providing means to enable said mounts to swing together about the vertical axis of the post means and to pivot on said post means about a horizontal axis passing through the lower end thereof;

d. a pair of electrical drive motors each being mounted on a respective said motor mount and having driven shafts extending therefrom and rotating in opposite directions at a predetermined speed with the respective axes thereof positioned parallel, laterally spaced, without lateral tilt and with a predetermined rearward tilt, said motors having in association therewith control means for controlling the energization and speed thereof;

e. a pair of cylindrical-shaped rotatable ball ejecting wheels mounted on respective shafts of said motors and being swingable and pivotable with the motor mounts therefor



about said respective vertical and horizontal axes, said wheels having ball engaging peripheral surfaces with a common central plane perpendicular to the axes of the wheels and of sufficient rigidity such that the outer surface of a ball may be at least slightly compressed when passing between said ball engaging surfaces;

f. a ball feed structure including a ball receiving hopper supported on said frame above said wheels and having a ball entry aperture in the bottom thereof, an electrically driven apertured disc mounted on said frame below said ball entry aperture and having a predetermined number of apertures to sequentially receive and pass successive balls one at a time and at a predetermined rate, and having in association therewith control means for controlling the energization and speed of said apertured disc, a plate member fixed below and parallel to said disc and containing a ball aperture therein, a flexible elongated hollow feed tube mounted with a ball receiving end fixedly positioned below said apertured disc and aligned with said plate ball aperture to receive each said ball passed by said apertured disc and plate aperture in succession and with the opposite discharge end of said tube being directed between said wheels whereby to guide said balls through said tube to said wheels in the peripheral direction of said ball engaging surfaces whereby each ball when received, is at least slightly compressed between and is ejected from and free of said ball engaging surfaces at some predetermined speed, said feed tube being flexible so as to permit changes in the angle of rearward tilt of said wheel axes and with the discharge end thereof being secured to said motor mounts in a manner enabling said tube discharge end to swing and pivot therewith; and

g. operator means mounted on said frame and operatively connected to swing and tilt said motor mounts about the respective said vertical and horizontal axes, said operator means including a first operator means connected to said motor mounts and adapted to pivot said motor mounts on said post means about said horizontal axis to adjust rearward tilting of said motor shaft and wheel axes and the vertical angle of ejecting a ball received between said wheels while causing said tube member to be appropriately flexed and its discharge end to be repositioned according to the amount of such adjustment and including a second operator means mounted on said frame arranged to swing said motor mounts about said post means vertical axis to adjust the horizontal positioning of said motor shaft and wheel axes and the horizontal trajectory of successive such balls, said second operator means includes a tracking type cam rotatably driven in coordination with said apertured disc, a lever having one end connected to follow the track of said cam, having an opposite end pivotally connected to a crank arm secured to said post means to swing said post means about its vertical axis and having a pivotal support block slidably and pivotally mounting said lever between said lever ends, said pivotal support block being positionable on said frame between said lever ends to control the amount said lever opposite end swings said crank arm and post means about said vertical axis as said lever one end tracks said cam.

3,913,553

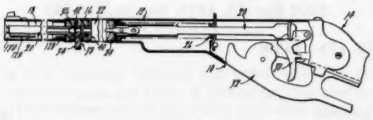
AIR GUN WITH REMOVABLE PROJECTILE HOLDING MEANS

Guy E. Braughler, Rogers; Earl L. Fischer, Bentonville; Lee F. Garmon, Jr., Rogers; William J. Miller, Springdale, and Melvin L. Simpson, Rogers, all of Ark., assignors to Victor Comptometer Corporation, Chicago, Ill.

Continuation of Ser. No. 124,803, March 16, 1971, abandoned. This application July 18, 1973, Ser. No. 380,220

Int. Cl.[2] F41B *11/00*

U.S. Cl. 124—15 **37 Claims**



1. A fluid operated gun comprising:

an elongated tubular housing,

a breech block mounted in said tubular housing and dividing it into a barrel chamber and an air compression chamber,

a barrel mounted in said barrel chamber for firing a projectile from the gun,

a piston mounted in said air compression chamber to compress air therein,

an axial passage extending through said breech block and connecting said air chamber and said barrel,

a transverse slot in said breech block intersecting said axial passage and opening through the outer peripheral surface of said breech block,

an access slot in said housing in alignment with said transverse slot,

a projectile holding member rotatably and transversely slidably mounted in said transverse slot,

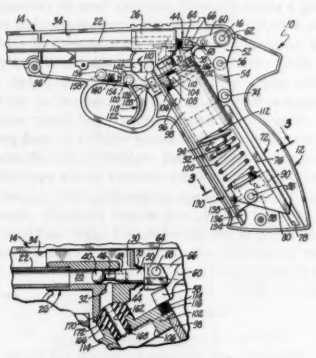
a plurality of projectile chambers in said member sequentially alignable with said axial passage and said barrel,

air passage sealing means effective between said air compression chamber and said projectile chambers in said member to provide a sealed air passage therebetween,
bearing means on opposite sides of said transverse slot,
axially extending shaft means supporting said member in said transverse slot on said bearing means,
detent means in the gun adjacent said transverse slot movable between a holding position and a release position relative to said member and engageable with said member in the holding position to rotatably releasably hold said member in said transverse slot,
spring means biasing said detent means to the holding position,
finger receiving means on said detent means to manually move said detent means from the holding position to the release position to permit insertion and removal of said member,
first abutment means on said detent means axially aligned with said projectile chambers and insertable therein to hold one of said chambers in firing position.

3,913,554
AIR OPERATED GUN

Kenneth R. Pitcher, deceased, late of Encino, Calif. (by Ethel J. Pitcher, administratrix), assignor to Healthways, Los Angeles, Calif.

Filed July 30, 1973, Ser. No. 384,070
Int. Cl.² F41B *11/00*
U.S. Cl. 124—15 **5 Claims**



4. A pneumatically operated pellet gun having a handle, a barrel mounted on said handle so as to extend from said handle, compression means for compressing air and trigger means for controlling release of compressed air into the breach end of said barrel in which the improvement comprises:
said barrel and said handle being pivotally connected to one another at the breach end of said barrel so as to be capable of being rotated with respect to one another from a normal operative position,
said barrel including a breach fitting located at the breach end thereof,
storage means for storing a quantity of pellets located on said barrel so as to extend along the length of said barrel, said storage means including a discharge opening leading from the interior thereof into said breach fitting,
breach block meeans for controlling entry of pellets from said storage means into the interior of said breach fitting, said breach block means being mounted rearwardly of said barrel and being movable relative to said breach fitting between a first position in which said discharge opening is covered by said breach block means and a second position in which said discharge opening is uncovered by said breach block means,
first mechanical means for moving said breach block means between said first position and said second position in accordance with the position of said handle relative to said barrel,
said compressing means being located entirely within said handle,
other mechanical means connecting said barrel, said handle and said compressing means for rendering said compressing means operative to supply compressed air when there is relative rotation between said barrel and said handle,
said compressing means comprising a cylinder, a piston movably mounted in said cylinder, a spring capable of being held under compression against said piston so that when said spring is released said piston is moved by said spring to compress air within said cylinder, and
latching means for holding said piston so that said spring is held under compression, and including
an unobstructed conduit leading from said compressing means to the breach of said barrel, and
retention means for releasably holding a pellet in the breach end of said barrel until the force exerted on the pellet by compressed air from said compressing means upon acutation of said trigger means exceeds the holding force on the pellet exerted by said retention means.

3,913,555
CLEANSER FOR PESTICIDE APPLICATION MEANS

Richard Paul Mommer, Loveland, Colo., assignor to Loveland Industries, Inc., Loveland, Colo.

Filed Oct. 31, 1973, Ser. No. 411,359
Int. Cl.² B08B *15/00;* **C11D** *3/065, 3/33*
U.S. Cl. 134—22 R **9 Claims**

1. A composition for removing the organic residue of agricultural pesticides from storage tanks and dispersal systems, the composition comprising the combination of (1) from about 72 to about 95 parts by weight of an alkali metal polyphosphate; (2) from about 5 to about 15 parts by weight of an organic detergent; (3) from about 0.02 to about 0.5 part by weight of an alkali metal chromate and from about 0.2 to about 5 parts by weight of a silicate salt selected from the group consisting of alkali metal meta-silicates, alkali metal sesqui-silicates and alkali metal ortho-silicates; (4) from about 0.5 to about 8 parts by weight of an alkali metal salt of a dihydroxyethyl glycine; and (5) a water-soluble dye, capable of providing a visible color in basic aqueous solutions at a dilution of as low as 1 ppm, in an amount of at least about 0.01 part by weight.

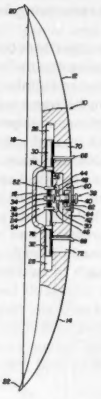
3,913,556
ARCHERY BOW TENSIONING DEVICE

James R. Palma, 1502 Curry Road, Schenectady, N.Y. 12306

Continuation-in-part of Ser. No. 407,801, Oct. 19, 1973, Pat. No. 3,826,239. This application May 28, 1974, Ser. No. 473,442The portion of the term of this patent subsequent to July 30, 1991, has been disclaimed.
Int. Cl.² F41B *5/00*
U.S. Cl. 124—30 R **9 Claims**

1. A tensioning device adapted to be located at the inner ends of the bowlimbs and comprising:
a pair of movable reinforcing means for reinforcing bowlimbs;
energy storage propulsion means operatively coupled to said reinforcing means for propelling said reinforcing means longitudinally of bowlimbs from retracted positions to extended positions to change the tension thereof of bowlimbs;
trigger means operatively coupled to said propulsion means

for actuating said propulsion means;
and retractor means operatively coupled to said reinforcing

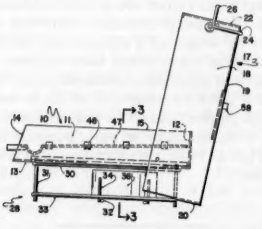


means for retraction of said reinforcing means from said extended positions back to said retracted positions.

3,913,557
BARBECUE OR COOKING UNIT

Theodore Ewanika, and William Walker, both of Winnipeg, Canada, assignors to Bilted Industries Ltd., Winnipeg, Canada

Filed Nov. 5, 1973, Ser. No. 412,540
Claims priority, application Canada, Jan. 23, 1973, 161837
Int. Cl.² F24C *5/04*
U.S. Cl. 126—43 **4 Claims**

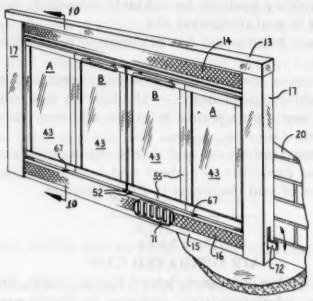


1. A cooking unit such as a barbecue and the like comprising in combination a casing having an apertured base, a pair of sides and a rear panel and means to support said casing, a cover for said casing closing off the upper and front side of said casing when closed, a source of heat under said casing and aligned with the aperture in said base, a heat propagating plate, said plate within said casing and spanning same, a cooking grill in said casing above said heat propagating plate, said grill being apertured whereby fat may be dripped through said grill onto said heat propagating plate, said heat propagating plate being apertured adjacent the perimetrical edges thereof whereby flames may pass through said plate and impinge upon the underside of said grill, said heat propagating plate being supported upon the underside of said grill, said source of heat including a container, absorbent means in said container, and a volatile heating fluid in said container, said container being situated below said heat propagating plate and in close proximity therewith whereby said heat propagating plate reflects back heat directly onto said container thereby increasing the rate of evaporation of said volatile fluid.

3,913,558
FIREPLACE SCREEN

Byron Lee Caldwell, Boring, Oreg., assignor to Pacific Fence and Wire Company, Portland, Oreg.

Filed May 20, 1974, Ser. No. 471,287
Int. Cl.² F24C *15/04*
U.S. Cl. 126—139 **8 Claims**

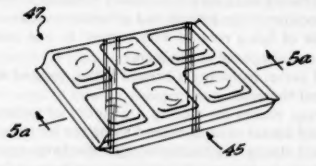


1. In a fireplace screen, a vertical frame having upper and lower channel strips forming the upper and lower edges of a door opening, a folding door in said opening comprising a pair of substantially identical door panels, each of said door panels comprising a single channel member bent to rectangular configuration with the flanges of the channel directed outwardly, a vertical pivot rod welded in the channel of said channel member along one vertical edge of the panel and projecting beyond the upper and lower edges of the panel, a pair of straight square bars welded in the channel of said channel member along the horizontal upper and lower edges of the panel, one end of each bar being welded to said pivot rod, a pair of L-shaped square bars welded in the channel of said channel member around the corners at the opposite vertical edge of said panel, a hinge connecting said opposite vertical edges of the two panels, and means pivotally mounting said vertical pivot rod of one panel in said upper and lower channel strips, the projecting upper and lower ends of the vertical pivot rod in the second panel being slidable in said upper and lower channel strips.

3,913,559
CONSTANT TEMPERATURE DEVICE

Walter B. Dandliker, La Jolla, Calif., assignor to Kay Laboratories, Inc., San Diego, Calif.

Filed Feb. 7, 1972, Ser. No. 223,966
Int. Cl.² F24J *1/00, 3/04*
U.S. Cl. 126—263 **11 Claims**



1. A portable combination for generating and retaining heat or cold and imparting said heat or cold to an object at a constant temperature comprising:
first means for generating heat or cold at temperatures having absolute magnitudes greater than the constant temperature;
second means for retaining the heat or cold generated by said first means, said second means having characteristics

for imparting said heat or cold to the object at the constant temperature for extended periods of time, the second means having properties of being recycled;

a first container enclosing said first means, said first container having a first wall capable of readily passing heat;

a second container enclosing said second means, said second container having first and second walls, said first wall of said second container being disposed in juxtaposition to the first wall of said first container, the first wall of the second container having properties of readily passing heat;

the second wall of the second container having properties of being disposed in juxtaposition to the object to maintain the object at the constant temperature; whereby

the heat or cold generated by said first means passes through the first walls of said first and second containers and is retained by said second means.

3,913,560

SUBMERGED COMBUSTION INSTALLATION

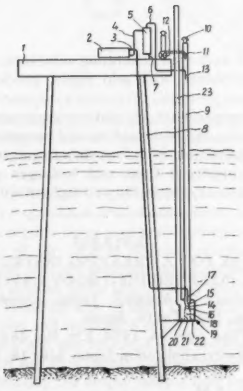
Flavien Lazarre, Moulie-a Pau; Gilbert Blu, Pau, and Jacques Rozand, Lorraine-a-Pau, all of France, assignors to Societe Nationale Des Petroles D'Aquitaine, Courbevoie, France

Filed Aug. 3, 1973, Ser. No. 385,330

Claims priority, application France, Aug. 4, 1972, 72.28208

Int. Cl.² F24H *1/18*

U.S. Cl. 126—360 R **13 Claims**



1. A submerged combustion installation for eliminating the combustible gas under pressure which is discharged from oil and gas separating appliances associated with hydrocarbon production wells, said installation comprising:

at least one submerged and watertight burner comprising at least one feed chamber for a combustible gaseous fuel mixture, encircled by a combustion chamber provided with ignition means for initiating combustion within said combustion chamber, said feed chamber and combustion chamber communicating with each other by means of a plurality of apertures,

at least one burner feed pipe, one end of which leads to open air while its other end is connected to the feed chamber of the burner by a diverging passage,

at least one injector connected to receive combustible gas under pressure from a separating appliance and extending within the burner feed pipe upstream of the diverging passage,

at least one discharge passage connected to the combustion chamber of the burner and leading to the open air, and,

means for adjusting the flow of combustible gas fed through the injector to the burner feed pipe.

3,913,561

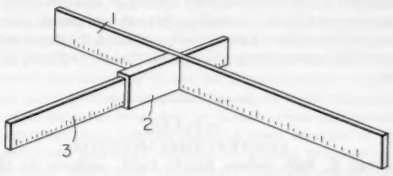
CORRECTING MEASURE DEVICE FOR CEPHALOMETRY

Koshi Maeda, 148, Yamazatocho, Showa-ku, Nagoya, Japan

Filed Dec. 28, 1973, Ser. No. 429,660

Int. Cl.² A61B *6/00*

U.S. Cl. 128—2 A **1 Claim**



1. A correct measuring device for cephalometry comprising:

a first bar-like plastic scale having a flat surface graudated with lead markings on said flat surface,

a plastic guide connected integrally with a central portion of said first scale, said guide extending outwardly from said flat surface and including an aperture oriented perpendicularly with respect to said flat surface of said first scale; and

a second bar-like plastic scale having a flat surface graduated with lead markings, and freely slidably mounted within said aperture in a plane perpendicular to that of said flat surface of said first scale.

3,913,562

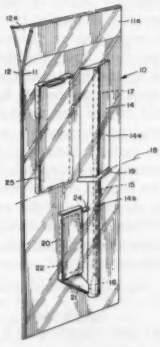
DISPOSABLE PACKAGE FOR COLLECTING AND TRANSPORTING CULTURES FOR LABORATORY ANALYSIS

Francis C. Moore; Leon R. Perkinson, and Billy E. Brown, all of Indianapolis, Ind., assignors to Moore-Perk Corporation, Indianapolis, Ind.

Filed Jan. 16, 1974, Ser. No. 433,909

Int. Cl.² A61B *10/00*

U.S. Cl. 128—2 W **23 Claims**



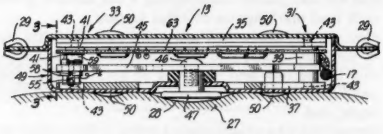
1. A disposable package for collecting and transporting culture specimens for laboratory analysis comprising a pair of flexible panels separably and resealably secured together by zones of pressure-sensitive adhesive disposed therebetween; one of said panels being formed of transparent plastic material; at least one of said panels being formed to define an elongated compartment between said panels; a swab disposed within said compartment having an enlongated handle and an absorbent tip portion; said panels being vertically elongated

and having a pair of unsealed tab portions at the upper ends thereof for gripping the respective panels and stripping the same apart; said compartment having an enlarged upper portion housing the upper end of said handle and a reduced lower portion containing the lower end of said handle and said absorbent tip; said one panel being provided with an outwardly-bulging and transversely extending pliable intermediate portion between said upper and lower portions of said compartment to permit downward folding of said one panel along a transverse fold line extending through said pliable intermediate portion without substantially reducing the cross sectional area of the compartment's lower portion immediately therebelow.

3,913,563
CONTRACTION MONITOR

Newton E. Ball, Solana Beach, Calif., assignor to Medical Instruments & Technology, San Diego, Calif.

Filed Mar. 8, 1974, Ser. No. 449,353
Int. Cl.² A61B 5/10
U.S. Cl. 128—2 S **30 Claims**



1. A contraction monitor adapted to be operatively disposed in contact with the abdominal wall of a mother during labor to sense muscle contractions in the abdominal wall, comprising:

a frame having a substantially fixed relationship with the abdominal wall of the mother;

first means constructed to contact the abdominal wall and responsive to a muscle contraction in the abdominal wall for moving relative to the frame;

first optical means having characteristics for emitting light, the first optical means having a fixed relationship relative to one of the frame and the first means;

second optical means including portions having a fixed relationship with the other of the frame and the first means and operatively coupled to the first means to provide a variable separation in distance from the first optical means dependent upon the movements of the first means relative to the frame, the second optical means having characteristics responsive to the light emitted by the first optical means for providing an output signal having characteristics dependent upon the distance separating the first optical means and the second optical means but substantially independent of any temperature variations in the second optical means; and

indicating means responsive to the output signal from the second optical means for providing an indication of the magnitude of the muscle contraction in the abdominal wall of the mother.

3,913,564
ANAEROBIC SPECIMEN COLLECTING AND TRANSPORTING DEVICE

Richard C. Freshley, 2063 W. Hazelwood Parkway, Phoenix, Ariz. 85015

Filed Apr. 24, 1974, Ser. No. 463,601
Int. Cl.² A61B 10/00
U.S. Cl. 128—2 W **7 Claims**

1. An anaerobic specimen collecting and transporting device comprising:

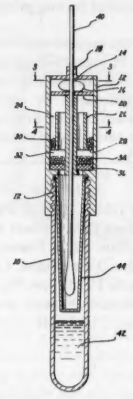
a transport tube for enclosing a specimen and maintaining the specimen in a predetermined atmosphere;

a compartmentalized closure removably secured to, and sealingly engaging, said tube;

a specimen gathering swab slidably mounted in said closure and extending through said closure into said tube;

said closure including a first compartment containing a frangible ampule having a liquid therein;

a second compartment in said compartmentalized closure communicating with the said first compartment and containing a hydrogen generating substance, said substance, when combined with said liquid, producing hydrogen; and

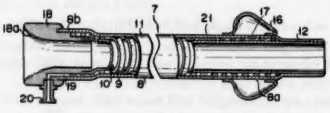


a third compartment in said compartmentalized closure communicating with said second compartment, containing a catalytic material for producing a combinative reaction of hydrogen from said hydrogen generating substance and oxygen in the atmosphere within said device.

3,913,565
GUIDE TUBE FOR A TREATING INSTRUMENT TO BE INSERTED INTO BODY CAVITY

Ichizo Kawahara, Kokubunji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1974, Ser. No. 464,141
Claims priority, application Japan, May 18, 1973, 48-55224
Int. Cl.² A61M 25/00; A61B 1/26
U.S. Cl. 128—2 M **4 Claims**



1. A guide tube for guiding a body cavity-treating instrument up to a predetermined position in a body cavity comprising:

a. a flexible tubular main body having a forward end and a base end at which the treating instrument is inserted into the main body, said main body including an inner tube, an outer tube having an aperture and a helical winding wound between the inner and outer tubes around the outer periphery of the inner tube;

b. a cuff mounted on said main body in the proximity of the forward end thereof and adapted to be expanded by the entry thereinto of fluid from the base end of the main body first through a space defined by said helical winding with the inner and outer tubes and then through said aperture thereby to be pressed against inner walls of the

body cavity to fix the forward end of the guide tube to the interior of the body cavity; and

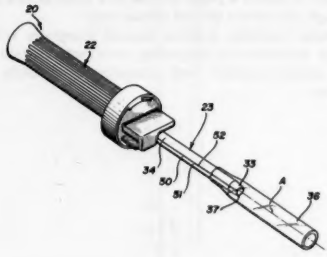
c. a flexible tube section further extended forwardly from the forward end of the main body and formed more flexible than the main body, whereby the forward end of the treating instrument inserted from the base end into the main body is sent forth from said flexible tube section and carried up to the predetermined position in the body cavity.

3,913,566

BIOPSY TOOL AND METHOD

Robert L. Lacey, Palatine, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed July 17, 1974, Ser. No. 489,451
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 B **11 Claims**



1. An initially one-piece device for obtaining biopsy samples and the like, including a hollow, axially elongated cylindrical tube member having a distal end and a proximal end, the distal end including a right conically bevelled cutting edge in a plane perpendicular to the tube axis which is adapted to cut and partially form a cylindrical biopsy sample core in a body, the tube member having both a line of separation and an oppositely disposed frangible hinge means extending longitudinally along the length of the tube in opposed relation to permit division to the tube into two separate halves defined by at least one substantially smooth linear edge, a wing member attached generally at the proximal end to each tube half and adapted to facilitate rotation and separation of the tube halves, at least one separated tube half and attached wing member so formed being adapted for use as a biopsy sample extraction tool for severing and extracting the biopsy sample core from the body which was cut by both halves before their separation, head means attached to one wing member to permit easy manipulation of the integral wing and tube half as the sample extraction tool, at least a portion of the other wing member being spaced apart from said head to permit said other wing member to be easily grasped and rolled relative to the head and head-grasped wing to frangibly fracture said hinge means.

3,913,567

ELECTROCARDIAC INFORMATION MONITORING APPARATUS

George L. Streckmann, Dallas, Tex., assignor to Medcraft Incorporated, Skippack, Pa.

Division of Ser. No. 141,917, May 10, 1971, abandoned, which is a division of Ser. No. 811,856, April 1, 1969, Pat. No. 3,651,280. This application Nov. 1, 1973, Ser. No. 411,768
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.06 G **2 Claims**

1. Apparatus for monitoring cardiac information about a human being, comprising:

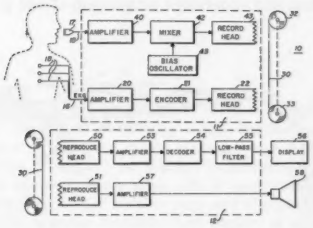
a. record means having two channels,

b. one of said two channels including transducer means for converting voice communication from said human being into representative audio signals,

c. means coupled to said transducer means for recording said audio signals onto one track of a magnetic tape,

d. the other of said two channels including electrode means adapted to be affixed to said human being for producing electrocardiac signals,

e. encoding means for modulating said electrocardiac signals to produce output signals from said encoding means comprising a series of constant magnitude positive and negative pulses, the ratio of the width of the negative pulses to the width of the positive pulses being proportional to the amplitude of the said electrocardiac signals, said encoding means comprising an input terminal coupled to said electrode means, an output terminal, a capacitor, an operational amplifier having its input connected to said input terminal and its output connected to said output terminal with the negative input terminal of the operational amplifier coupled to ground through said capacitor, and a pair of feedback resistors respectively coupled from the output of the operational amplifier to the negative and positive inputs of said operational amplifier,



f. means for recording said modulated output signals onto another track of said magnetic tape,

g. reproduce means having two channels,

h. a first playback head within one of said reproduce channels for reproducing said audio signals on said one track of said magnetic tape,

i. loudspeaker means coupled to said playback head for recreating said voice communication,

j. a second playback head for reproducing signals from said second track of said magnetic tape,

k. decode means coupled to said second playback head for effectively restoring the said reproduced signals from the second track to the same waveshape as the said modulated output signals from the encoding means,

l. filter means for converting said restored signals to electrocardiac signals of the type produced by said electrode means, and

m. means coupled to said filter means for displaying said electrocardiac signals.

3,913,568

NASOPHARYNGOSCOPE

George J. Carpenter, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

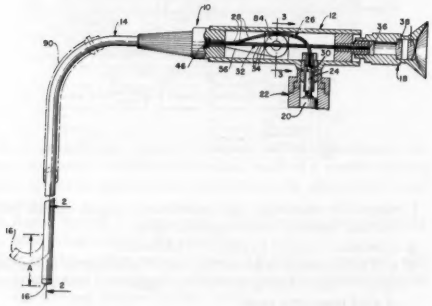
Continuation of Ser. No. 325,299, Jan. 22, 1973, abandoned. This application June 7, 1974, Ser. No. 477,543
Int. Cl.² A61B *1/06*
U.S. Cl. 128—11 **4 Claims**

1. In an articulable fiberscope instrument having a main supporting body, a fiber optic probe extending away from said main supporting body, said probe being freely laterally flexible in all directions throughout the intermediate and proximal portions of its length, a multiplicity of light-conducting fibers extending from adjacent the distal end of said probe internally therethrough into said main supporting body, a flexible image-conducting bundle of optical fibers also extending from a point adjacent said distal end of said probe internally therethrough into said main supporting body, means for directing

light into proximal ends of said multiplicity of light-conducting fibers in said main supporting body for transmission of said light to said distal end of said probe and illumination of objects disposed forwardly thereof, objective lens means within said distal end of said probe, said lens means being constructed and arranged to form images of said illuminated objects in said image-conducting bundle of fibers for transmittance to said main supporting body and viewing therein, and an external flexible sheathing covering said probe, wherein the improvement comprises;

said distal end of said probe being terminated with a rigid fitting containing said objective lens means and said lens means being sealed within said rigid fitting;

a series of vertebrated annuli surrounding said image-conducting fiber bundle only distally of said probe, the number of said annuli being preselected according to the length of distal articulation desired of said fiberscope instrument, each annulus including a pair of oppositely diametrically disposed pivot lugs extending away from one side thereof and a pair of oppositely diametrically disposed sockets in its opposite side, said lugs of one annulus being engaged in sockets of an adjoining annulus to form said vertebrated relationship of said series;



said external flexible sheathing being distally terminated against said rigid fitting and connected thereto with a fluidtight seal preventing contamination of said series of vertebrated annuli by matter encountered externally of said probe;

remotely operable wire means extending from said main supporting body through said proximal and intermediate portions of said probe to said series of annuli;

anchor means fixed to said rigid fitting for receiving said wire means adjacent the most distally disposed annular of said series of annuli, said wire means being extended through said series of annuli and affixed to said anchor means;

holding means adjacent the oppositely disposed last annulus of said series of annuli for permanently retaining said vertebrated relationship of said annuli; and

means in said main supporting body for receiving and selectively manipulating said wire means to remotely articulate said series of annuli and the corresponding distal portion of said probe separately and independently of said free flexing of its intermediate and proximal portions.

3,913,569

BREAST DEVELOPMENT APPARATUS

Thomas S. Kanonas, 48 Greenfield Drive, Windsor Locks, Conn. 06096

Filed Nov. 4, 1974, Ser. No. 520,259

Int. Cl.² A61H 7/00

U.S. Cl. 128—67 **5 Claims**

1. A breast development apparatus intended for use by a woman to tone and develop the tissues of the breast, the apparatus comprising:

a rigid elongated cylindrically shaped handle member including an elongated cylindrically shaped body member having cylindrical side walls, a flat top end, and a flat bottom end;

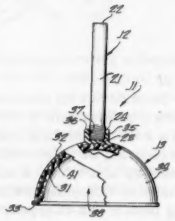
screw threads disposed about a portion of the circumference of said cylindrical side walls adjacent said bottom end thereof;

a hemi-spherically shaped hollow body breast cup member manufactured of resilient material and having an exterior surface and a hemi-spherically shaped interior continuous surface;

a hemi-spherically shaped compartment defined interiorally of said breast cup and opening out of a bottom surface thereof;

a flange member formed integrally with said wall surfaces and extending completely about the peripheral edges thereof to define a plane normal to a vertical axis passing through the vertex of said breast cup;

an annular shoulder portion formed integrally with said flange member and projecting outwardly of said breast cup exterior surface and extending completely thereabout;



an annular member formed integrally with said flange member and projecting outwardly therefrom in a direction inwardly of said breast cup to form a shoulder completely therearound;

a cylindrically shaped boss member formed integrally with said wall surfaces and projecting radially outwardly of the exterior surface thereof in a direction concentric with the vertical axis of said breast cup, said cylindrical boss member having cylindrical side walls and a flat top surface extending parallel to the plane defined by said flange;

a cylindrical recess formed integrally in said boss member and opening out of the top surface thereof and being of a circular diameter;

screw threads disposed completely about the interior wall surfaces of said circular recess adapted to threadedly receive therein the threaded portion of said handle member to detachably retain said handle member to said breast cup;

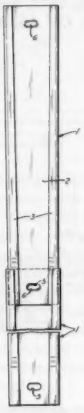
a resilient flexible lining disposed about the complete interior surfaces of said breast cup compartment completely separating the interior of said compartment from said breast cup wall surfaces; and

an adhesive coating provided completely over said interior surface of said breast cup for adhesively securing said resilient lining material thereto.

3,913,570
SURGICAL SPLINT ASSEMBLY

James F. Madden, McKeesport, and Gordon C. Scott, Verona, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Aug. 22, 1974, Ser. No. 499,769
Int. Cl.[2] A61F 5/04
U.S. Cl. 128—87 R 4 Claims



1. A surgical splint assembly comprising a plurality of substantially identical rigid splint units, each of said units being in the form of a single metal strip tapered in width from end to end and provided with integral side flanges turned inwardly toward each other, the free edges of the flanges being opposed to each other and spaced apart, the portions of said flanges at the wide end of the strip being spaced from the strip a distance equal to substantially twice the thickness of the strip, and the portions of said flanges at the opposite end of the strip being disposed substantially flat against the strip, the narrower end of each unit being removably inserted in a like splint unit between the wide end of its strip and the flanges spaced therefrom to telescopically wedge the two units together.

3,913,571
PLASTER CASTS

Gerhard Bayer, Ludwigshafen-Rheingonheim; Manfred Haerter, Neuhofen; Egon Cherdron; Fritz Fässle, both of Limburgerhof; Ernst Urmann, Ludwigshafen-Mundenheim, all of Germany; Hermann Rüter, deceased, late of Ludwigshafen (Rhine), Germany; by Elisabeth Rüter, heiress, and Edla Rüter, heiress, both of Ludwigshafen (Rhine), Germany, assignors to Gebr. Giulini GmbH, Ludwigshafen (Rhine), Germany

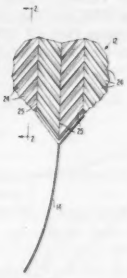
Continuation-in-part of Ser. No. 789,971, Jan. 8, 1969, abandoned. This application Feb. 25, 1974, Ser. No. 445,145
Claims priority, application Germany, Jan. 11, 1968, 1616146
Int. Cl. C04b 11/00
U.S. Cl. 128—91 14 Claims

1. In a plaster bandage having a bandage and calcium sulfate hemihydrate as the plaster, the improvement wherein the calcium sulfate hemihydrate is fine particle size hydrothermally produced alpha calcium sulfate hemihydrate having an average grain size below 7 microns which average grain size is lower than the average size which provides optimum mechanical properties in a pure gypsum body cast from the said alpha calcium sulfate hemihydrate.

3,913,572
PLEATED MEMBRANE INTRAUTERINE CONTRACEPTIVE DEVICE

Robert G. Wheeler, Richland, Wash., assignor to The United States of America as represented by the Secretary of State, Washington, D.C.

Filed June 14, 1974, Ser. No. 479,582
Int. Cl.[2] A61F 5/46
U.S. Cl. 128—130 6 Claims

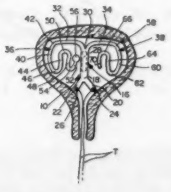


1. An intrauterine contraceptive device adapted to be placed in the uterus comprising a soft flexible membrane containing a plurality of pleats arranged in a herringbone pattern along at least one vertical line of intersection, wherein each pleat situated on the same side of said vertical line of intersection is parallel to another pleat and wherein each pleat slopes in the opposite direction with respect to an adjacent pleat located on the opposite side of said vertical line of intersection, whereby said contraceptive device is contractable laterally without buckling allowing said membrane to conform to the shape of uterine cavities smaller in width than the width of the uncontracted device and whereby said membrane can compress laterally into a configuration having a substantially rectangular cross-section to facilitate placement in the uterus.

3,913,573
INTRAUTERINE CONTRACEPTIVE DEVICES WITH PLURAL PARALLEL LEG SEGMENTS

Morton Gutnick, 8329 Fairview Road, Elkins Park, Pa. 19117

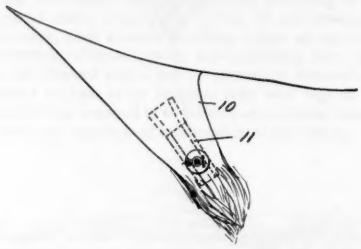
Continuation-in-part of Ser. No. 294,200, Oct. 2, 1972, abandoned. This application Jan. 11, 1974, Ser. No. 432,435
Int. Cl.[2] A61F 5/46
U.S. Cl. 128—130 30 Claims



1. An intrauterine contraceptive device comprising:
a. a thin, elongated body member having a longitudinal axis, a proximal end and a distal end;
b. a pair of arms extending substantially transversely with respect to said axis, each arm having an outer end;
c. each of said outer ends terminating in a convolute member which extends downwardly toward the proximal end of said body member and inwardly toward said body member and having a connecting section connecting each convolute member to said body member;

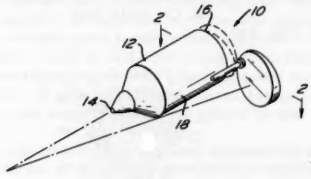
d. each of said convolute members including at least three substanially elongated leg segments substantially parallel to said body member and connected to substantially arcuate segments; and
e. said body, arms and convolute members being formed of a flexible thermoplastic material.

3,913,574
APPARATUS FOR SEXUAL RESTRAINT OF A BULL
Lewis C. Schacht, 5009 Vernon, Tallahassee, Fla. 32301
Division of Ser. No. 435,265, Jan. 21, 1974, Pat. No. 3,878,845. This application Oct. 18, 1974, Ser. No. 516,201
Int. Cl.² A01K 21/00
U.S. Cl. 128—138 R 6 Claims



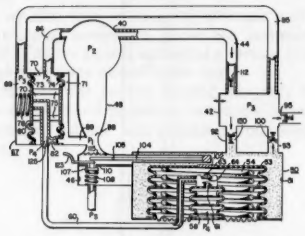
1. Sexual restraint apparatus for a bull comprising a tubular blocking member for insertion into a bull's sheath, said blocking member having a transverse opening therein, said transverse opening being aligned with two opposite incisions and the walls of the bull's sheath, a pin for insertion and extension seriatum through one of the incisions, the transverse opening in the blocking member and the other incision, and retainer means attached to said pin at either end thereof for retaining said pin in its position extending through both incisions in the bull's sheath.

3,913,575
EYE DROPPER DEVICE WITH A MIRROR
Robert K. Windsor, 417 Spruce St., Philadelphia, Pa. 19106
Filed Nov. 8, 1973, Ser. No. 414,013
Int. Cl.² A61M 11/00
U.S. Cl. 128—233 13 Claims



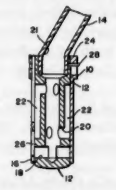
1. A device for dispensing eye drops comprising
a. a bottle for holding eye drops, said bottle having an axial opening at one end and a bottom at its other end,
b. a generally wedge shaped member having a front face and a rear face, a mirror on said front face, said member having a first portion which is thinner than a diametrically opposite portion so that said front face is angled relative to the axis of said bottle,
c. pivoting means at said first portion connecting said first portion of said member to said bottle for pivotal movement about an axis generally parallel to the axis of said bottle between first and second positions, said first position being under said bottle so that said bottle may be supported on said rear face of said member, said second position being alongside said bottle to enable a user to see the reflection of his eye in said mirror as drops are dispensed from said bottle in an axial direction.

3,913,576
BREATHING APPARATUS
Frank E. Martin, Chester; John R. Colston, Annapolis, and Norman E. Smith, Pasadena, all of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Nov. 6, 1973, Ser. No. 413,413
Int. Cl.² A62B 7/04
U.S. Cl. 128—142.2 13 Claims



1. Breathing apparatus comprising:
a. means for providing a user with a gas to be breathed;
b. a gas saver means for the capture of the user's exhaled breath;
c. sensing means for sensing an indication of the volume of an inhalation by the user; and
d. means responsive to said sensing means for closing off said gas saver means, as a function of said inhalation so that no more exhaled gas will be accepted thereby during the exhalation.

3,913,577
ASPIRATOR TIP
Samuel A. Nehra, 19980 Wedgewood, Gross Pointe Woods, Mich. 48236; Oscar C. Saad, 25106 Anchorage Drive, Mount Clemens, Mich. 48043, and Raymond E. LaBrecque, 11234 Irvington Drive, Warren, Mich. 48093
Filed Sept. 18, 1974, Ser. No. 507,147
Int. Cl.² A61M 1/00
U.S. Cl. 128—276 9 Claims

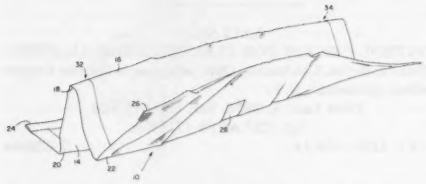


1. An aspirator tip comprising a tubular core member having radially extending primary openings therethrough, longitudinally extending relief passages therein intersecting at least some of said primary openings, and means for selectively closing the relief passages and said intersecting primary openings or said other primary openings to provide dual mode aspirator operation.

3,913,578
DISPOSABLE DIAPER

Charles H. Schaar, Lake Zurich, Ill., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 3, 1973, Ser. No. 421,157
Int. Cl. A61f *13/16*
U.S. Cl. 128—287 **5 Claims**

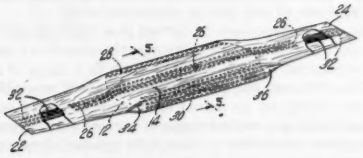


1. In a diaper having a longitudinal axis, lateral margins, front and back waistline regions with a crotch region therebetween, an inner surface for contact with the wearer and an outer surface, the improvement comprising the provision of a longitudinally extending fold on each side of said axis at a predetermined distance from said axis, a portion of said diaper in said crotch region adjacent one of said folds being secured to a similarly disposed outer surface portion adjacent the other fold, whereby in said crotch region said fold lines are restrained to a maximum separation which is less than the sum of said predetermined distances, said fold lines being unrestrained in said waistline regions.

3,913,579
FLUSHABLE SANITARY NnapkIN

Subramani Srinivasan, East Brunswick, and Daniel M. Sivilich, South River, both of N.J., assignors to Personal Products Company, Milltown, N.J.

Filed Oct. 15, 1974, Ser. No. 514,533
Int. Cl.² A61F *13/16*
U.S. Cl. 128—290 W **20 Claims**

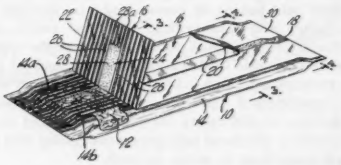


1. A sanitary napkin comprising: a generally rectangularly shaped absorbent pad; a nonwoven fibrous cover surrounding said pad, said cover being rectangular in shape and larger than said pad, the opposite side marginal edges of said cover being folded over said pad and into overlapping relationship with one another, the opposite end edges of said cover extending beyond the ends of said pad and providing attachment tab means, said fabric being bonded with a water-soluble resinous binder; and hot-melt adhesive means applied to spaced selected generally rectangular zones of said cover for reinforcing said cover against wear in said zones, a first of said zones being located generally medially of said cover and disposed generally centrally of said pad on the face thereof to be positioned against the body of the wearer, a second and a third of said zones being spaced generally equally outwardly of said generally medially located zone and disposed in a position adjacent the opposite side edges of the pad, and a fourth of said zones being located along one side marginal edge of said cover and extending from end to end thereof to provide reinforcement in said attachment tab means, the areas of said cover outwardly of said zones being free of said hot-melt adhesive means whereby said cover is disintegratable after soaking in excess water to permit diposal by flushing.

3,913,580
ADHESIVELY ATTACHED ABSORBENT PRODUCT

James A. Ginocchio, Summit, N.J., assignor to Personal Products Company, Milltown, N.J.

Filed Oct. 16, 1974, Ser. No. 515,387
Int. Cl.² A61F *13/16*
U.S. Cl. 128—290 W **9 Claims**



1. An absorbent product for adhesive attachment to a wearer's garment comprising:

an absorbent pad having longitudinal sides, transverse ends, a first generally rectangular face to be disposed toward the body of the wearer and a second generally rectangular face to be disposed toward the garment of the wearer;

a fluid pervious cover having at least a portion positioned adjacent said first face, said cover being generally rectangular and larger and wider than said pad; the opposite longitudinal marginal portions of said cover being folded over adjacent and longitudinal sides of said pad and extending inwardly over the second face of said pad;

a fluid impervious barrier sheet overlying said inwardly extending portion of said cover, said barrier sheet being generally coextensive in length with said cover;

pressure sensitive adhesive means extending longitudinally on the outer face of said barrier sheet;

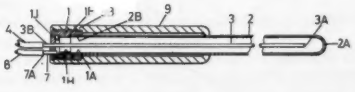
a protective strip covering said pressure sensitive adhesive means and releasably adhered thereto; and

adhesive means on the inner face of said barrier sheet for attaching said barrier sheet to said product, said adhesive means comprising a plurality of lines extending longitudinally of said barrier sheet and parallel with the side edges of said pad and a band of adhesive coaligned with and beneath said pressure sensitive adhesive means, said band of adhesive being at least as wide as said pressure sensitive adhesive means.

3,913,581
CRYOGENIC APPARATUS

Carl Ritson, Upavon, and Ernest Hilton Thomas, Kingston, Near Marlborough, both of England, assignors to Spembly Limited, England

Filed June 1, 1973, Ser. No. 366,004
Claims priority, application United Kingdom, June 2, 1972, 25910/72
Int. Cl.² A61B *17/36*; F25D *3/08*, *3/10*
U.S. Cl. 128—303.1 **23 Claims**



1. A cryosurgical instrument for use with a remote source of pressurized gas and adapted to operate in a cooling mode and in a rapid warming mode, comprising:

a body enclosing a caviyty having a wall of high thermal conductance, said wall being shaped externally for contacting human tissue and providing heat transfer with the tissue and being of sufficient structural integrity to withstand the full source pressure;

a first conduit extending through said body and connected to said cavity terminating therein in a restricted orifice through which pressurized gas may expand into said cavity experiencing Joule-Thompson cooling in so doing and thereby cool said wall when said first conduit is connected to said source of gas;

a second conduit connected to said cavity;

an exhaust passage leading to atmosphere; and

valve means for providing a cooling mode gas-flow path from said source of pressurized gas, through said first conduit and said orifice, into said cavity, and then through said exhaust passage, whereby the expansion of as through said orifice cools said wall, and for selectively providing a heating mode gas-flow path from said source of pressurized gas, through said second conduit, and directly to said cavity for pressurizing said cavity sufficiently to condense said gas on the cooled wall and liberate latent heat to warm the wall.

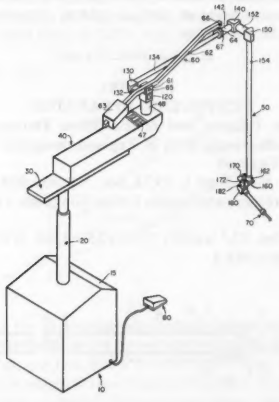
16. A method of cooling and then warming the highly thermally conductive wall of an expension chamber in a cryosurgical instrument, the external surface of the wall providing the applicator surface of the instrument, the method comprising: introducing a pressurized gaseous refrigerant from a source thereof into said chamber through flow-restricting means while connecting said chamber to a region of pressure lower than the pressure of said source, thereby cooling said wall and said applicator surface by the Joule-Thomson effect; and then pressurizing said chamber from said source of pressurized gaseous refrigerant through a flow path separate from said flow-restricting means so that said refrigerant condenses on said wall and liberates latent heat thereto, thereby warming said wall and said applicator surface.

3,913,582

LASER DEVICE WITH ARTICULATED ARM

Uzi Sharon, Tel-Aviv, Israel, assignor to Laser Industries Ltd., Ramat-Aviv, Israel

Filed Oct. 17, 1973, Ser. No. 407,047
Claims priority, application Israel, Oct. 17, 1972, 40603
Int. Cl.² A61B *17/36*
U.S. Cl. 128—303.1 **22 Claims**



1. Apparatus for guiding a laser beam comprising:

an articulated structure;

a series of beam redirecting means supported by said structure and arranged to successively reflect said beam, said articulated structure providing means for varying the position of the beam redirecting means to vary at least one of the position and direction of the beam from the last of said beam redirecting means;

means for rotating at least a portion of the articulated structure about a first axis;

a supporting arm coupled at one point to said portion of the articulated structure that is rotatable about said first axis, said supporting arm being rotatable about a second axis spaced apart from and parallel to said first axis; and

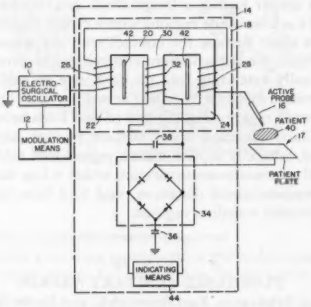
means for supporting both said articulated structure and said supporting arm.

3,913,583

CONTROL CIRCUIT FOR ELECTROSURGICAL UNITS

William T. Bross, Cincinnati, Ohio, assignor to Sybron Corporation, Rochester, N.Y.

Filed June 3, 1974, Ser. No. 475,668
Int. Cl.² A61B *17/36*
U.S. Cl. 128—303.14 **7 Claims**



1. In combination with an electrosurgical unit having an oscillator applying variable high frequency current to a plurality of patient electrodes, a control circuit comprising:

a saturable reactor connected between said oscillator and at least one of said patient electrodes; and

bias means responsive to current flow through said patient electrodes for biasing said saturable reactor to control the impedance thereof, whereby for a first range of current flow through said patient electrodes said saturable reactor represents an inductive reactance to said oscillator and during a second range of current flow through said patient electrodes substantially greater than said first current flow said reactor represents a lower inductive reactance to said oscillator.

3,913,584

COMBINATION MYRINGOTOMY SCALPEL, ASPIRATOR AND OTOLOGICAL VENT TUBE INSERTER

David L. Walchle, and Raymond H. Haerr, both of Cincinnati, Ohio, assignors to Xomox Corporation, Cincinnati, Ohio

Filed June 28, 1974, Ser. No. 484,272
Int. Cl.² A61B *17/32*; A61M *27/00*
U.S. Cl. 128—305 **11 Claims**

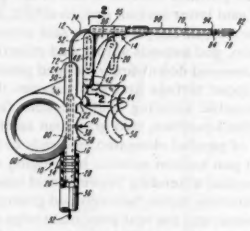
1. A surgical instrument constituting a myringotomy scalpel, aspirator and otological vent tube inserter comprising:

a hand grip member including an elongate, substantially tubular portion having opposite ends and a passageway therethrough;

a trigger hingedly connected to said tubular portion intermediate the ends thereof;

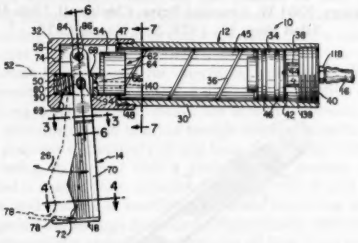
an elongate, hollow, aspirator tube associated with said hand grip member, said tube having opposite ends, one of which is disposed in open communication with one end of the passageway through said hand grip member, the other end of said tube terminating in a free, outer end which defines a hollow, scalpel-defining tip;

an elongate sleeve slidably carried by said aspirator tube;
means operably interconnecting the sleeve and trigger whereby pivotal movement of the trigger imparts linear movement to the sleeve along said aspirator tube; and



a coupling in association with the other end of the passageway through said hand grip member for connection to a source of negative pressure.

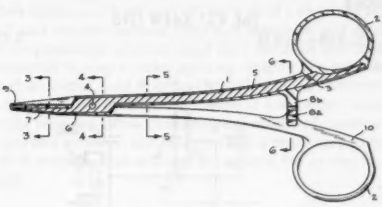
3,913,585
SURGICAL CUTTING INSTRUMENT
Sidney Wolvek, Brooklyn, N.Y., assignor to Technibiotics, Inc., Brooklyn, N.Y.
Filed July 26, 1973, Ser. No. 382,951
Int. Cl.² A61B *17/32*; B26B *7/00*
U.S. Cl. 128—305 **10 Claims**



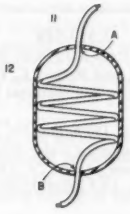
1. A surgical cutting instrument comprising:
a housing;
a knife including a shank portion which extends into said housing and a knife edge portion, said shank being pivotally connected to said housing;
a movable piston slidably disposed within said housing;
a floating plunger slidably disposed within said housing in coaxial alignment with said piston; and
a movable linkage connected to said housing and permanently connecting said knife shank portion to said plunger for causing said knife edge portion to move in a cutting stroke substantially parallel to the longitudinal axis of the housing upon movement of said plunger.

3,913,586
HEMOSTAT
Carl B. Baumgarten, Houston, Tex., assignor to Gomco Surgical Manufacturing Corporation, Buffalo, N.Y.
Filed Jan. 28, 1974, Ser. No. 437,064
Int. Cl.² A61B *17/28*
U.S. Cl. 128—325 **5 Claims**

1. A surgical hemostat comprising a pair of intersecting arms and a pivot means interconnecting said arms for rotating motion about a common axis, said arms each comprising a tempered stamped wire metal core having a handle portion, a jaw portion and a box portion intermediate said handle and jaw portions, said arms each being individually permanently embedded in a plastic shell comprising a finger loop juxtaposed to said handle portion, a gripping surface juxtaposed to said jaw portion, and a latching means on said handle portion on the opposite side of said handle from said finger loop and in substantially the same plane therewith, said gripping surfaces on each jaw being operably opposed and said latching means being operable engagable when said handle portions are rotated toward each other for holding said handle portions in a fixed position, and operably engaging said gripping surfaces.



3,913,587
IMPLANTABLE EXTENDABLE MEMBER
Mahmoud S. Newash, Saginaw, Mich., assignor to Dow Corning Corporation, Midland, Mich.
Continuation of Ser. No. 423,612, Dec. 10, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,544
Int. Cl.² A61M *25/02*
U.S. Cl. 128—348 **5 Claims**



1. A surgically implantable device for transfer of fluids or energy in an animal body, having tissue and fluids, the device formed of a material substantially inert to the tissue and fluids comprising;
a one piece elongated member designed to interconnect two separated parts of the body, and
a hollow capsule having an inner diameter at least five times greater than the outer diameter of the elongated member surrounding a portion of said elongated member and containing an unrestrained coiled length portion of said elongated member within the hollow of said capsule which length portion is substantially longer than the hollow; the hollow capsule having a smooth, uninterrupted walls defining openings at each end thereof circumscribing a portion of the elongated member, the elongated member is freely slidable through said openings when tension is applied between the opposite ends of the device.

3,913,588
HEART DIFIBRILLATOR WITH INDEPENDENTLY OPERATING STARTING PULSE GENERATOR

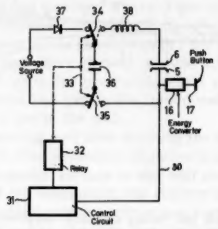
Antonius Maria Klomp, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1971, Ser. No. 128,044

Claims priority, application Netherlands, Mar. 8, 1970, 7005064

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 D **2 Claims**



1. A heart defibrillator comprising:
mechanically activatable means for generating a mechanical energy pulse;
means responsive to said mechanical energy pulse for converting said mechanical energy pulse into an electrical energy pulse;
two electrodes for contacting the body of a patient;
means for supplying a high voltage pulse to said electrodes, said pulse supplying means being normally deactivated; and
means responsive to said electrical energy pulse for activating said pulse supplying means,
whereby a high voltage pulse is supplied to said electrodes upon mechanical activation of said mechanical energy pulse generating means.

3,913,589
GRAIN PAN BOTTOM DOOR

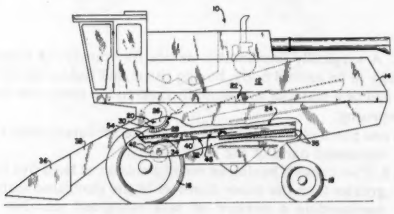
Paul L. Rouse, Moline, and Robert L. Francis, East Moline, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Feb. 8, 1973, Ser. No. 330,828

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² A01F *12/30*

U.S. Cl. 130—24 **8 Claims**



1. In a combine harvester of the type having crop harvesting instrumentalities, in combination, a housing enclosing threshing and cleaning apparatus and having a forward material receiving opening, said threshing apparatus including a threshing drum and a cooperating concave in the vicinity of said material receiving opening, said cleaning apparatus including a grain pan assembly disposed below the level of said concave and including a two-part articulated grain pan proper consisting of two grain pan sections disposed in edge-to-edge relationship and including a generally horizontal rectangular fixed rear section and a rectangular movable forward door section mounted for swinging movement about a transverse horizontal axis in the vicinity of the forward edge of said fixed section between a raised position wherein it lies in the general horizontal plane of said latter section and, in effect, constitutes a continuation thereof, directly underlies said concave in close proximity thereto, and extends across said material receiving opening, and a lowered downwardly inclined position wherein it exposes its upper surface and also exposes the concave, means for releasable securing said movable forward door section in its raised position, said grain pan assembly further includes a pair of parallel elongated side rails between which said fixed grain pan section extends in bridging relationship, a transverse crossbar extending between said side rails in the vicinity of the juncture region between said grain pan sections, hinge means connecting the rear proximate edge of said movable forward door section to said crossbar, said hinge means comprises an elongated hinge bar secured to said crossbar, said hinge bar establishing an upwardly facing channel, and a hinge pin disposed on the rear transverse edge of said forward door section and removably seated within said channel whereby, when said releasable securing means is released, the door panel may be raised bodily vertically and thus released from the grain pan assembly.

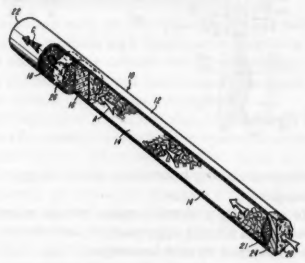
3,913,590
CIGARETTE HAVING DISTINCT TOBACCO FILLERS WITH INERT, POROUS, NONCOMBUSTIBLE ELEMENT INTERPOSED THEREBETWEEN

Boris Sway, 7201 W. Aracoma Drive, Cincinnati, Ohio 45237

Filed Mar. 11, 1974, Ser. No. 449,970

Int. Cl.² A24D *01/06*

U.S. Cl. 131—9 **1 Claim**

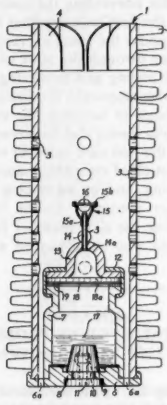


1. A multi-sectioned cigarette comprising an elongate, open-ended, tubular wrapper defining an outer end and a draw end of the cigarette; a first tobacco filler contained in said wrapper adjacent the outer end of the cigarette comprising a blend of solvent extracted natural tobaccos having a reduced amount of tar producing substances and nicotine and extending the major portion of the overall length of the wrapper; a second tobacco filler contained in said wrapper adjacent the draw end of the cigarette comprising a blend of flavored tobaccos; an inert, noncombustible, porous element of diatomaceous earth transversely spanning the interior of the tubular wrapper between said first and second tobacco fillers; a heat-sink element transversely spanning the interior of the tubular wrapper between the said noncombustible element and the said second tobacco filler, said heat-sink element comprising a roll of crinkled, metal foil; and means on the outer periphery of the wrapper to identify the draw end and the outer end thereof, said means comprising a hollow, elongate, open-ended, tubular mouthpiece circumscribing the outer periphery of the wrapper adjacent the draw end of the cigarette.

3,913,591
HAIRDRESSER'S IMPLEMENT

William Zoth, 1100 Penn Center Blvd., Apt. 315, Pittsburgh, Pa. 15235

Filed Aug. 30, 1974, Ser. No. 501,992
Int. Cl.[2] A45D *1/00*
U.S. Cl. 132—9 6 Claims

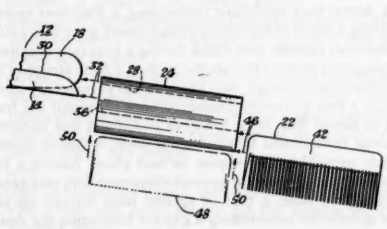


1. A hairdresser's implement for curling and combing hair and for substantially reducing the transfer of heat from a heating element to a comb of said implement, said implement comprising a curling iron having a pivotable tong, a comb, and a bracket for securing said comb to said tong, said bracket and said comb being shaped for interfitting quick-detachable engagement, said bracket having a trough configuration extending along a side thereof, means for securing outward lateral edge portions of said bracket trough configuration to lateral edge portions respectively of said tong, said trough configuration being so shaped that a preponderant portion of said bracket is spaced from a preponderant portion of said tong to define and enclose at least one thermally insulating and heat dissipating air passage extending longitudinally therebetween for substantially reducing the transfer of heat from said tong to said bracket and said comb.

3,913,592
HEATED HAIR ROLLER

Bruno P. Morane, and Pierre Alexandre, both of Paris, France, assignors to L'Oreal, Paris, France

Filed Aug. 30, 1973, Ser. No. 393,052
Claims priority, application France, Sept. 15, 1972, 72.32753
Int. Cl.[2] A45D *2/12*
U.S. Cl. 132—33 20 Claims

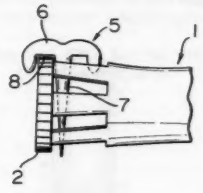


1. In a heating roller comprising a substantially cylindrical hollow body carrying therewithin a reservoir for holding under pressure a combustible material which is liquefied under said pressure, and a catalyst which sustains combustion of said material when contacted thereby, said catalyst being in contact with the ambient air inside the roller and freely accessible from outside said roller, the improvement which comprises a member positioned between the reservoir and the catalyst through which said material gradually diffuses and expands under the pressure within the reservoir to provide a small substantially constant flow of combustible gas, said member defining at least part of one wall of a chamber on the side of said member remote from said reservoir, and an elongated longitudinally unobstructed duct between said catalyst and chamber having an inlet opening directly into said chamber and an outlet, said duct and chamber being substantially sealed against said ambient air except at said outlet, whereby said duct receives a flow consisting essentially of combustible gas from said member, and said duct being positioned to direct said flow through said ambient air against the center of said catalyst.

3,913,593
ROD FOR USE IN COLD PERMANENT WAVING

Nakaya Sato, Tokorozawa, Japan, assignor to Arimino Chemical Co. Ltd., Tokyo, Japan

Filed July 5, 1974, Ser. No. 485,947
Claims priority, application Japan, Feb. 9, 1973, 48-16681
Int. Cl.[2] A45D *2/00*
U.S. Cl. 132—40 9 Claims



1. A combination of a rod and a fastening pin specifically designed for use in conjunction with said rod for use in cold permanent waving, the rod having a substantially hollow cylindrical shape and a plurality of slots circumferentially spaced in the proximity of both tips thereof, and the fastening pin having an elastically deformable neck, a leg extending from the neck, and a dent formed at the connecting portion of the neck and the leg, with the leg of the fastening pin penetrating into the rod in a direction perpendicular to the longitudinal axis of the rod through the slots and the dent in the fastening pin engaging elastically the tip of the rod, thereby fixing the pin to the rod.

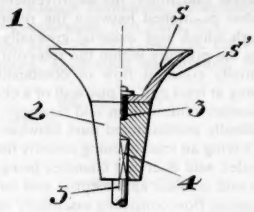
3,913,594
AUTOMATIC NAIL POLISHING DEVICE

Sakichi Tsukamoto, 1,3-chome, Toyotama Kita, Nerima, Tokyo, Japan

Filed Dec. 20, 1973, Ser. No. 426,939
Claims priority, application Japan, May 19, 1973, 48-55175
Int. Cl. A45d *29/04*
U.S. Cl. 132—76.4 1 Claim

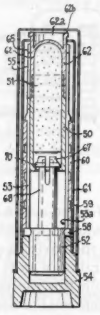
1. An automatic nail polishing device comprising a replaceable funnel-shaped member, a support member for supporting said funnel-shaped member, and driving means having a rotatable shaft for rotating said funnel-shaped member and said support member, said support member having a slot at the bottom thereof for receiving said rotatable shaft for rotation therewith, said funnel-shaped member having an outer concave surface and an inner convex surface, said funnel-shaped member having a gradually decreasing cross-sectional thickness as its outer terminating end is approached, said outer terminating end being in the form of an arcuate annular sur-

face, a lining of polishing buffs on said inner and outer surfaces, said lining of polishing buff being of a coarser grade on



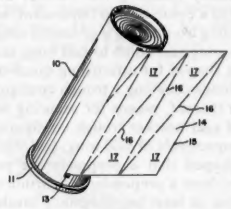
one of said surfaces than the lining of polishing buff on the other surface, and a lining of polishing buff on said arcuate annular surface.

3,913,595
COSMETIC CASE
Yvan Victor Grisel, Mies, Switzerland
Filed May 1, 1974, Ser. No. 466,019
Claims priority, application Spain, May 14, 1973, 191470; May 14, 1973, 191471; May 14, 1973, 191472; May 14, 1973, 191473; Sept. 28, 1973, 195683
Int. Cl.² A45D *40/26*
U.S. Cl. 132—88.7 **3 Claims**



1. A cosmetic case comprising
1. a first case member,
2. a tubular casing open at both ends,
3. a stick of cosmetic material fitting closely within the casing and supported over a major part of its length by the casing,
4. an elongate slide member engaging one end of the stick within the casing over a major part of the surface of the one stick end and extending through one end of the casing,
   a. the slide member being mounted for longitudinal sliding movement in the first case member and
   b. the tubular casing being mounted for longitudinal sliding movement in the first case member for relative longitudinal movement of the casing and the slide member whereby the slide member can be advanced with respect to the casing to push the stick along the casing and thereby to push the other end of the stick out of the casing, and retraction of the slide member results in separation of the slide member from the stick without corresponding retraction of the stick in the casing,
5. means retaining the tubular casing detachably with respect to the case and slide members whereby, when the stick of cosmetic materials has been exhausted, the casing can be detached and replaced by a similar casing containing a fresh stick of cosmetic material,
6. abutment means on the slide member and the casing for preventing complete withdrawal of the slide member from the casing under a separating force below a predetermined value, and
7. further abutment means on the first case member and the tubular casing for preventing the casing from advancing with respect to the first case member beyond a predetermined position under the force exerted by the slide member on the casing through the stick of cosmetic material whereby, by advancing and retracting the slide member longitudinally with respect to the casing without exerting force great enough to advance the stick in the tubular casing, the tubular casing can be advanced and retracted with respect to the first case member without altering the position of the stick of cosmetic material with respect to the tubular casing, and by advancing the slide member until the further abutment means engage and subsequently advancing the slide member further, the stick of cosmetic material can be advanced with respect to the tubular casing.

3,913,596
DENTAL HYGIENE PRODUCT
Edward B. Stuart, 3264 Nottingham Drive, Pittsburgh, Pa. 15235
Filed May 23, 1974, Ser. No. 472,694
Int. Cl.² A61C *15/00*
U.S. Cl. 132—89 **9 Claims**

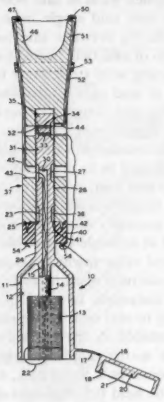


1. A singly-ply ribbon rolled into a spool and having transverse tear-lines of weakened tensile strength defining triangular tabs of the said ribbon, each of the said tabs having an apex-to-base dimension corresponding to the ribbon width.

3,913,597
FLOSS HOLDER
James E. Day, 48 School Ave., Chatham, N.J. 07928
Filed Sept. 20, 1974, Ser. No. 507,697
Int. Cl.² A61C *15/00*
U.S. Cl. 132—92 R **3 Claims**

1. A dental floss applicator comprising, a dispenser spindle for holding a spool of the dental floss, a shank protruding from said dispenser spindle, said shank having a generally longitudinal passageway formed therein for leading a fresh strand of the dental floss therethrough, said longitudinal passageway terminating in a first generally transverse bore to permit the fresh strand of dental floss to be led from said shank and to permit the dental floss strand to wind upon itself, a female spindle relatively movable with respect to said shank having a first aperture formed therein for general alignment with said generally transverse bore, a pair of spaced tines formed on said female spindle for establishing a gap for tensioning the dental floss strand thereacross, said female spindle having a second aperture formed therein, said protruding shank having a pair of generally transverse bores formed therein and spaced longitudinally from said first transverse bore, said generally transverse bores being in general alignment with said second fe-

male spindle aperture for enabling a used strand of the dental floss to be led from said pair of spaced tines through said second female spindle aperture and through each of said generally transverse bores in opposite respective directions to



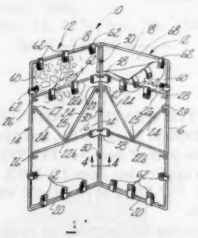
take a purchase on and separating the used dental floss strand from the fresh strand led through said first transverse bore and selectively applying tension to the dental floss strand in response to the relative movement of said spindles.

3,913,598

HUNTER'S BLIND AND SHELTER

Roy H. Glutting, Jr., 11696 Appleton, Detroit, Mich. 48239, and Howard Glutting, 26300 Springfield Drive, Farmington, Mich. 48024

Filed Sept. 17, 1973, Ser. No. 397,976
Int. Cl.[2] A45F 1/16
U.S. Cl. 135—4 R **5 Claims**



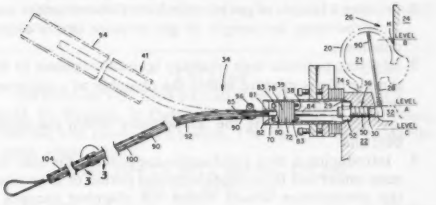
1. A portable hunter's blind and shelter, comprising:
a plurality of generally rectangular panels;
a plurality of removable hinges interconnecting adjacently disposed panels to allow pivotal movement of said panels about said hinges;
a plurality of removable angularly adjustable lock members which releasably engage adjacently disposed panels to retain said panels in a predetermined angular relationship with each other by restraining pivotal movement of said panels about said hinges;
a wall,
means to removably attach said wall to said panels to provide cover and concealment for the hunter using said hunter's blind,
wherein each of said panels comprises:
two spaced apart generally parallel standards;
a top cross member disposed generally perpendicularly to said standards, and being connected at one of its ends to one end of one of said standards and being connected at the other of its ends to one end of the other of said standards;
a bottom cross member disposed in spaced parallel relationship to said top cross member, and being connected at one of its ends to the other end of said one of said standards and being connected at the other of its ends to the other end of said other of said standards;
at least one intermediate cross member disposed between and parallel to said top cross member and said bottom cross member, said intermediate cross member having two arcuately shaped ends concavely facing toward each other, each of said arcuate ends being connected to a different one of said standards, and wherein said removable lock member comprises:
a generally V-shaped main body portion having a predetemined included angle;
a generally U-shaped first end;
a generally U-shaped second end;
said first and second generally U-shaped ends each engage a different one of said arcuately shaped ends of said intermediate cross members to maintain a predetermined angular relationship between said adjacently disposed panels.

3,913,599

COIL SPRING VENTING ARRANGEMENT

Ralph M. McCugh, Pittsburgh, Pa., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 30, 1974, Ser. No. 510,839
Int. Cl.[2] F16K 24/04
U.S. Cl. 137—1 **10 Claims**

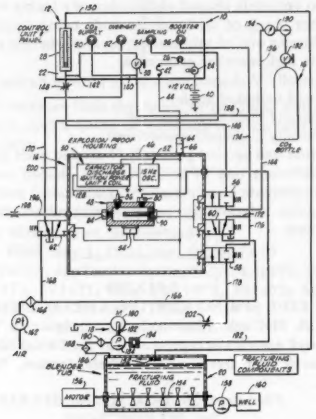


7. In a hydraulic chamber filled with fluid, and having a defined fluid level, vent passage, vent passage entrance and fluid access passage, an apparatus for venting trapped gas comprising:
means for guiding a spring into said chamber, said guide means disposed to be sealably connected to said vent passage and continuous with said vent passage;
inner means and outer means for sealing said guide means passageway to said vent passage and vent passage entrance respectively, said inner and outer sealing means having defined passageways sealably connected to said guide means passageway and vent passage entrance respectively by means for connecting said sealing means to said guide means and vent passage entrance respectively, said outer sealing means surrounding said inner sealing means and having a compressive seal therebetween; each of said inner and outer means defining a movable free end whereby each of said free ends may be positioned above or below said chamber fluid level;
a spring sufficient to be insertable in a continuous passageway defined by said inner sealing means and guide means passageways whereby trapped chamber gas is vented to the atomsphere from said chamber along the passageway defined by spring when said inner sealing means is located in a first predetermined position below said chamber fluid level.

3,913,600
METHOD AND APPARATUS FOR MONITORING AND CONTROLLING THE COMPOSITION OF FLAMMABLE GAS MIXTURES

Bruce M. Cox, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Sept. 3, 1974, Ser. No. 502,389
Int. Cl.² G01N *25/12*, *25/54*; G05D *11/13*
U.S. Cl. 137—6 **4 Claims**



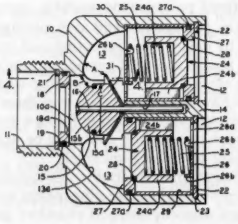
1. A method of sensing the presence of a flammable gas mixture within a zone under test, comprising the steps of:

1. drawing a sample of gas mixture from the zone under test;
2. introducing the sample of gas mixture into a closed chamber;
3. applying periodic high intensity ignition impulses to the sample of gas mixture within the chamber at a predetermined frequency;
4. continuously sensing the temperature within the chamber; and
5. introducing a non-combustion-supporting gas into the zone under test for a predetermined period of time when the temperature sensed within the chamber exceeds a predetermined value in response to the ignition of a flammable gas mixture sample within the chamber.

3,913,601
PRESSURE RELIEF AND CHECK VALVE COMBINATION

John R. Hanson, Warren, Pa., assignor to Tiona-Betts, Inc., Warren, Pa.

Filed May 31, 1974, Ser. No. 475,101
Int. Cl.² F16K *17/36*
U.S. Cl. 137—39 **3 Claims**



1. A pressure relief and check valve combination comprising an integral hollow body having a single cylindrical bore opening at one end of said body and identical twin cylindrical bores opening at its other end; said single bore partially overlapping said twin bores laterally; there being passages in said body, one in line with each of said twin bores; said passages merging by streamlined walls in said body from the outer side of each twin bore into said single bore; a dividing partition extending longitudinally between said twin bores; a normally closed valve in each of said twin bores; a weighted check valve mounted on a coacting axial stem; there being a recess extending longitudinally of said recess into which said stem passes; said stem mounting said weighted check valve opposite the inner end of said single bore and concentric therewith; an annular valve seat mounted in said single bore; said weighted check valve so arranged as to move between closed and open position relative to said seat; said valve combination normally in use having said single bore turned upwardly, whereby said weighted valve is normally open, but closes by gravity when said body is turned at an angle to provide a gravity component urging said weighted valve toward said seat; each of said twin bores having a recess near each its ends, said recesses spaced at identical fixed distances; two identical complexes for assembly respectively in said twin bores; each complex comprising a lock ring seatable in one of said recesses, an annular valve seat and disk spring-supporting retainer, each fitting in the other of said recesses, a valve disk, a helical compression spring adapted to be held between said disk retainer and said valve disk, and a thin-walled sleeve insert fitting snugly in each twin bore acting as a guide for each normally closed valve and as a spacer between the valve seat and the disk spring-supporting retainer in each twin bore; and a generally conical deflector positioned opening upwardly between said stem and said weighted check valve and extending into each of said passages sufficiently to cause stream flow upwardly through said passages to be deflected with a downward component on top of said weighted check valve; whereby said complexes may be assembled in said twin bores with said valve disks both opening upwardly, or both opening downwardly, or with said disks opening in opposite directions, with said helical springs suitably chosen; whereby said valve combination may act as a pressure relief valve in one or two directions, at the same or at two different pressures, and flow is checked if an attached container is overturned.

3,913,602
HYDRANT WITH HEATING AND PURGING MEANS

Young Z. Yoon, 2930 E. Madison St., Des Moines, Iowa 50317

Continuation-in-part of Ser. No. 113,273, Feb. 8, 1971, abandoned. This application June 13, 1973, Ser. No. 369,599
Int. Cl.² E03B *9/14*; F16K *49/00*
U.S. Cl. 137—60 **11 Claims**

1. A fluid connector for coupling an underground source of fluid to an above-ground surface utilization point comprising:

conduit means including a housing having an inlet, an outlet and a flow passage therebetween;

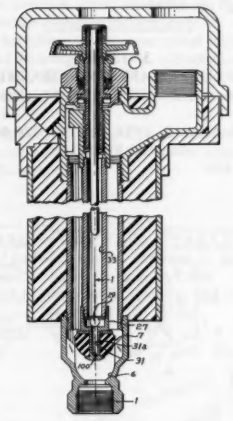
said inlet adapted to be attached to an underground source of fluid and said outlet providing an egress adjacent the ground surfaces and adapted to be coupled in fluid communication to a utilization station;

fluid control means including a fluid means including a fluid control element disposed within said conduit means to provide control of the fluid flow through the flow passage of said conduit means;

said fluid control means including an elongated member for supporting the fluid control element adjacent the inlet and extending through at least a portion of the flow passage to a position adjacent the top of the housing;

heating means positioned adjacent the elongated member within the flow passage, said heating means and said fluid control means being disposed in co-axial alignment to facilitate withdrawal thereof from said conduit means; and

said heating means including an elongated heating element extending along said elongated member terminating above said fluid control element whereby heat is supplied to the flow passage above said fluid control element.

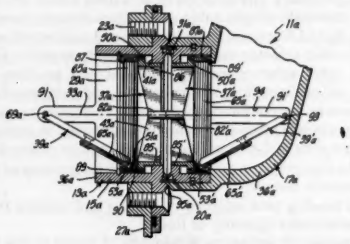


3,913,603

CRASHWORTHY FLAPPER VALVE

Jorge Torres, Newbury Park, Calif., assignor to Purolator, Inc., Newbury Park, Calif.

Filed Jan. 14, 1974, Ser. No. 433,129
Int. Cl.² F16K 17/40
U.S. Cl. 137—68 **25 Claims**



1. A crashworthy valve comprising:

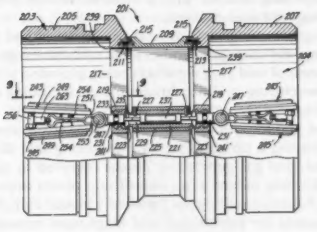
body means having a passage therethrough, said body means including first and second sections and a frangible region therebetween which allows relative movement between said sections when said sections are subjected to a predetermined load;

means defining a valve seat in each said section;

at least one valve element cooperating with the associated valve seat in each said section;

means for mounting each said valve element for pivotable movement about a pivot axis between an open position in which the valve element is spaced from the associated valve seat and a closed position in which the valve element is in engagement with the associated valve seat to close said passage at each said valve seat;

means in the passageway in each section for releasably holding each said valve element in said open position; and means responsive to relative movement between said sections for freeing each said valve element from the holding action of each said holding means whereby each said valve element is freed for movement to said closed position.

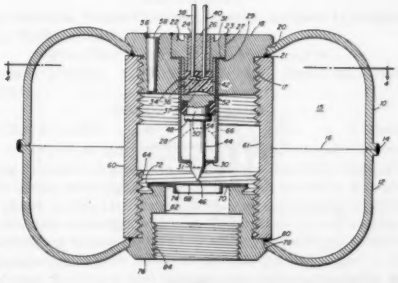


3,913,604

PISTON-ACTUATED FLUID DISCHARGE DEVICE

David E. Hanson, 8 Oakridge Drive, North Easton, Mass. 02334, and Harry M. Landers, 156 Flaggler Drive, Marshfield, Mass. 02048

Filed July 13, 1972, Ser. No. 271,581
Int. Cl. B67b 7/24
U.S. Cl. 137—68 **17 Claims**



1. A piston-actuated fluid-discharge device comprising, in combination:

means forming a storage chamber for pressurized fluid comprising an annular shell having central openings at opposite axial ends thereof, a pair of plug members received conformably in said openings and welded circumferentially to said shell, and an annular cylindrical spool received coaxially within said shell and threaded at opposite ends thereof in said plug members, said spool being formed with an opening communicating the interior thereof with the interior of said shell;

a first one of said plug members being formed with a fluid discharge passage of circular cross-section;

a nozzle insert overlying an inlet end of said discharge passage and formed with a squared orifice portion extending into said passage;

diaphragm means overlying said nozzle insert and normally sealing said storage chamber from said discharge passage;

a second of said plug members being provided with means for puncturing said diaphragm means including cylinder-forming means extending axially within said spool, a piston slidably received in said cylinder-forming means and having a tip adapted for puncturing said diaphragm means, and gas-generating means received in said cylinder-forming means at an end of said piston opposite said tip for driving said piston forwardly in said cylinder-forming means for puncturing said diaphragm means;

said piston being formed with a first circumferential flange portion conformably and slidably received in said cylinder-forming means, and with a second circumferential flange portion spaced apart along said piston from said first flange portion, said second flange portion being circumferentially spaced apart from said cylinder-forming means;

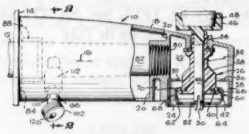
and sealing ring means received about said piston between said flange portions and sealingly engaging said cylinder-forming means.

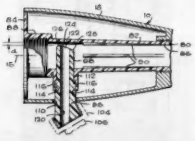
3,913,605

TUB SPOUT ASSEMBLY

Irving A. Ward, 2709 La Cuesta Ave., Hacienda Heights, Calif. 91745

Filed Mar. 11, 1974, Ser. No. 449,949
Int. Cl.² F16K *1/00*
U.S. Cl. 137—119 **12 Claims**





1. A spout assembly comprising:

a spout housing having a discharge opening;

a diverter valve mounted within the spout housing;

a conduit mounted within the spout housing for conducting water from a water supply pipe to the diverter valve, said conduit having a bore;

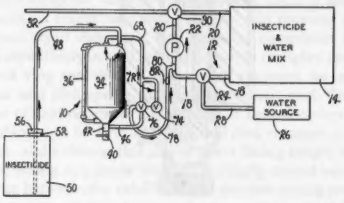
a tube projecting into the bore of the conduit, the tube being disposed generally transverse of the direction of flow in the conduit, the tube having an inlet end within the bore, the inlet end having an inlet orifice and being shaped to deflect water past the inlet orifice and thereby minimize entry thereof into the inlet orifice during flow of water through the diverter valve, the diverter valve being selectively operable to prevent water outflow from the discharge opening to thereby divert the water to flow out through the tube.

3,913,606

FLUID MEASURING CIRCUIT

David L. Anderson, Jr., 2930 19th St., Bakersfield, Calif. 93305

Filed Jan. 2, 1974, Ser. No. 430,072
Int. Cl.² F04F *3/00*
U.S. Cl. 137—205 **1 Claim**



1. A substantially sealed, manually operable liquid measuring circuit particularly adapted to be connected with a liquid transfer circuit and employed for delivering thereto measured quantities of toxic liquids comprising:

A. valve means including,

1. a valve housing having means defining therein a first port, a second port disposed in spaced relation with said first port, and a third port disposed in spaced relation with said first and second ports,

2. valve selector means movably seated within said housing and repositionable from a first position, wherein said selector means serves to connect said first port in communication with said second port, to a second position, wherein said selector means serves to interrupt communication between said first and second port, and thence to a third position, wherein said selector means serves to connect said first port in communication with said third port, and

3. manually operable valve actuating means including a manually displaceable, pivotally supported handle projected from said valve housing and connected with said valve selector means for selectively repositioning said valve selector means from said first position to said second position, and thence to said third position;

B. means for continuously applying a vacuum to said valve means including a first conduit connected in communication with said first port and adapted to be connected with the low-pressure side of a liquid transfer pump of a liquid transfer circuit;

C. a holding tank adapted to receive and confine therein a measurable quantity of liquid;

D. means for delivering a quantity of liquid to the holding tank including,

1. a tubular member having a first end portion connected in communication with the holding tank and a second end portion adapted to be connected in communication with a container confining therewithin a quantity of liquid maintained under ambient atmospheric pressure, and

2. a second conduit connected between said holding tank and said second port through which said second port communicates with said holding tank for evacuating

the interior of said holding tank when said first and second ports are connected in communication;

E. liquid discharge means including,

1. a third conduit connected between said holding tank and said third port through which said third port communicates with said holding tank for discharging a measured quantity of liquid from said holding tank to said first conduit when said first and third ports are connected in communication, and

2. means including a pressure relief circuit connected with said holding tank for introducing atmospheric pressure into said holding tank in response to a repositioning of said valve selector means to said third position; and

F. means including a sight-gauge mounted on said holding tank for continuously indicating the quantity of liquid confined therein.

3,913,607

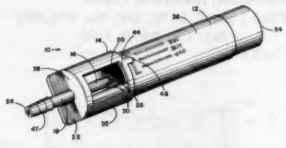
OXYGEN DILUTION APPARATUS

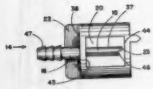
John H. Price, LaJolla, Calif., assignor to Hudson Oxygen Therapy Sales Company, Temecula, Calif.

Filed May 7, 1974, Ser. No. 467,750

Int. Cl.² F16K *19/00*

U.S. Cl. 137—271 **8 Claims**





5. An oxygen dilution apparatus comprising:

a. a hollow cylindrical member open at both ends, one end having at least one slot extending along an end portion of said cylinder,

b. first and second air diluton caps, one for supplying lower oxygen concentrations and the other for higher concentrations each cap having an end wall and a cylindrical side wall defining a chamber and having at least one port extending therealong said cap rotatably engaging the slotted end portion of said cylindrical member and an oxygen supply pipe extending inwardly of said cap chamber and having means exterior of said cap for securing an oxygen supply the thereto, and

c. means on said cylindrical member for preventing securing the lower or higher concentration air dilution cap on said cylindrical member when the other concentration is desired.

3,913,608

KEG ADAPTER VALVE

Mack S. Johnston, 26 Hitching Post Drive, Rolling Hills, Calif. 90274

Filed Aug. 20, 1973, Ser. No. 390,153

Int. Cl.² B65D *83/00*

U.S. Cl. 137—322 **16 Claims**

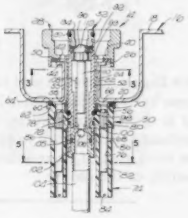
1. A keg adapter valve assembly for installation in a keg which includes a wall portion having inner and outer surfaces and containing a dispensing opening with an inner periphery in said wall portion, comprising:

A valve member to be mounted internally of the keg with an outer end which contains means for sealing engagement with the inner surface of the wall portion adjacent the dispensing opening of a keg in which it may be mounted;

a generally central opening extending through the valve member from the outer end thereof for alignment with the dispensing opening of the keg;

a gas passageway separate from said central opening and extending through the valve member from said outer end; normally closed valve means in communication with said gas passageway;

a tapper connector member for mounting externally of a keg at the dispensing opening in the wall portion thereof and including an inner end having means for holding engagement with cooperating holding means at the outer



end of the valve member, said tapper connector member containing a passageway extending therethrough which is in alignment with the dispensing opening and the central opening in the valve member when the latter and the tapper connector member are in holding engagement and positioned on opposite sides of the wall portion of a keg and forms a continuous passage with the central opening in the valve member.

an elongated tubular member containing a liquid passageway therethrough, dimensioned for insertion from the outside of the keg, through the passageway in the tapper connector member, the dispensing opening in the wall portion of the keg and the generally central opening of the valve member, and into assembled holding engagement with at least one of said members; and

normally closed liquid valve means in said liquid passageway.

3,913,609

HEAD FOR CONNECTION TO REPLACEABLE GAS CARTRIDGE

Roger Remane, Sainte-Colombe, France, assignor to Application Des'Gaz, Paris, France

Filed Nov. 12, 1973, Ser. No. 415,134

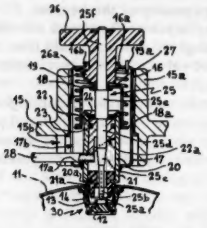
Claims priority, application France, Nov. 10, 1972, 72.40621

Int. Cl.² B65D *83/14*

U.S. Cl. 137—322 **7 Claims**

1. An improved connection head for use on a device consuming pressurized gas from a removable cartridge having in a wall of the cartridge facing the head an inwardly displaceable check valve, said connection head comprising a casing opposite said cartridge, a sleeve reciprocable in said casing, a rod extending through the casing and having a finger disposed to displace said check valve, an annular packing fixed to the sleeve and the sleeve and packing coaxially surrounding the finger, spring means in the head and operative to urge the sleeve outwardly toward the wall of the cartridge to seal the packing thereagainst and to urge the rod outwardly toward the cartridge so that the finger displaces the check valve of the cartridge, said improvement comprising the connection head wherein said spring means is operative between the casing and the rod for urging the finger outwardly of the head, the yield

limit of said spring means being further chosen so that the yieldable force of the spring means on said finger will be sufficient to displace and hold open said valve but will be insufficient to puncture the wall of the cartridge, said improvement comprising further, mutually abutting stops for



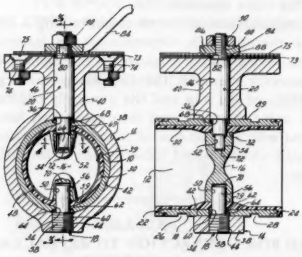
imparting force from said rod to said sleeve in such an unidirectional manner as to shift said sleeve outwardly of the casing when the rod is urged outwardly by the spring means, the sleeve being released by the stops to retract inwardly into the casing at least for a part of its return travel when the rod is displaced inwardly of the casing.

3,913,610

BUTTERFLY VALVE

George J. Paptzun, Cincinnati, Ohio, assignor to The Lunkenheimer Company, Cincinnati, Ohio

Filed Jan. 28, 1974, Ser. No. 437,206
Int. Cl.² F16K 1/22
U.S. Cl. 137—375 **10 Claims**



1. A valve assembly for controlling the flow of fluids comprising, in combination:

a tubular sleeve member providing a passage for the flow of fluids therethrough adapted for connection at its outer ends in a conduit and having a pair of diametrically opposed openings in the wall thereof located intermediate said ends;

a unitary valve housing member mounted upon and surrounding said sleeve between said ends, said housing member including a main body portion having a circular opening axially therethrough of a diameter larger than the diameter of said sleeve member such that said valve housing member is slidable onto said sleeve member, and a bonnet portion extending radially of said main body portion and of said sleeve, said valve housing member having first and second diametrically opposed bores extending through said main body portion and said bonnet portion, respectively, radially of said sleeve member and being aligned with said openings in said sleeve member, said first bore being internally threaded;

a valve disc pivotally mounted within the passage of said sleeve member, said valve disc being rotatable between an open position and a position closing said passage;

an externally threaded member threadably engaging said first bore and having an inwardly facing shoulder portion, said shoulder portion on said threaded member being effective to exert a radially directed pressure on said sleeve to rigidly lock said housing member in position on said sleeve, said threaded member further having a support portion in alignment with a first opening in said sleeve, said last named support portion rotatably supporting said valve disc;

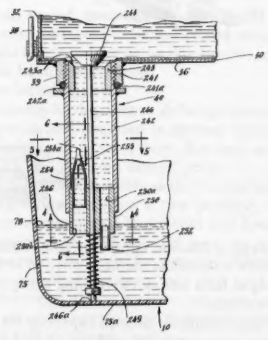
upper stem means rotatably mounted in said second bore and extending radially inwardly through the second opening in said sleeve, said upper stem means being received in an opening in said valve disc and being effective to support said valve disc, said upper stem means having a flat portion, a cooperating flat portion being formed in the opening of said disc and extending parallel to the flat portion of said stem, said cooperating flat portions being effective to cause pivotal movement of said disc upon rotation of said upper stem means.

3,913,611

LIQUID DISPENSING APPARATUS

John G. St. John, Wilton, Conn., assignor to Baldwin-Gegenheimer Corporation, Stamford, Conn.

Filed June 6, 1974, Ser. No. 476,894
Int. Cl.² B67D 3/00
U.S. Cl. 137—453 **3 Claims**



1. For use in a vacuum-controlled gravity-feed liquid dispensing system of the type in which a superposed reservoir supplies liquid to an underlying receptacle to maintain a relatively fixed level of liquid in the receptacle, an improved assembly for feeding liquid between the reservoir and the receptacle, said assembly comprising:

A. a main conduit of relatively large cross-section having at one end a compartively open connection with the supply reservoir for both conducting air to the supply reservoir and for conducting liquid from the supply reservoir; and

B. means partially blocking the other end of said main conduit but providing

1. a first passage by which liquid flowing from the supply reservoir into said main conduit may be admitted to the receptacle at a point below the intended normal surface level of said liquid in the receptacle;

2. a second passage of relatively limited cross-section opening at a point below the intended normal surface level of liquid in the receptacle, said second passage defining

a. a first laterally directed orifice of relatively restricted cross-section communicating between the interior of said second passage and the interior of said main

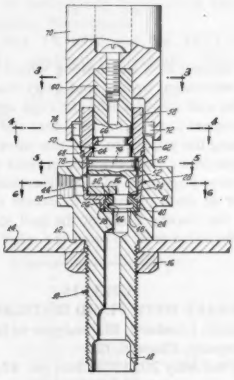
conduit to complete an open connection between a point below the intended normal surface level of liquid in the receptacle and the interior of the main conduit; and

b. a second laterally directed air admitting orifice of relatively restricted cross-section located to have its center line approximately at the normal surface level of the liquid and communicating with the interior of said second passage, so that a slight lowering of the liquid will admit air through the main conduit by successive movement through said second orifice, said second passage and said first orifice.

3,913,612
ECCENTRIC SHEAR SEAL CARTRIDGE VALVE

Julius L. Tolnai, Los Angeles, Calif., assignor to Price-Pfister Brass Mfg. Co., Pacoima, Calif.

Filed Dec. 16, 1974, Ser. No. 532,878
Int. Cl.² F16K *25/00*
U.S. Cl. 137—454.6 **9 Claims**



1. In combination:

a. a hollow cartridge cage open at its top for reception of a control member;

b. a collar projecting eccentrically downwardly from the bottom of the cage;

c. the bottom of said cage having an opening registering with the collar;

d. a generally tubular seal member fitted to the collar with its upper end projecting through the said bottom opening and with its lower end projecting downwardly beyond said collar;

e. a valve body having a chamber into which said cage is fitted as well as a recess accommodating said collar and seal member; said valve body recess having an inlet registering with said lower end of said seal member and having an outlet registering with the cage;

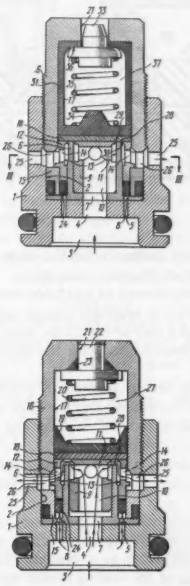
f. an angularly movable control member in the cage and having a lower flat surface opposed to, and in engagement with, the said upper end of said tubular seal member; said control member having a passageway opening at one end at said flat surface to transit the upper end of said seal member, and opening at the other end at a place to register with said body outlet; and

g. clamp means urging the said cage and control member downwardly to force said lower end of said tubular seal member against the said valve body recess and the said control member flat surface into engagement with the said upper end of said tubular seal member whereby static and dynamic valve seals are both provided by said tubular seal member.

3,913,613
SAFETY VALVE

Boris Nikolaevich Kostjunin, Teply Stan, 1 mikroraion, korpus 7, kv. 398; Alfred Fedorovich Zadvorny, prospekt Vernadskogo, 91, korpus 2, kv. 105, both of Moscow; Arnold Mikhailovich Ragutsky, ulitsa Fedorova, 4, kv. 47, poselok Malakhovka, Moskovskoi oblasti, and Vladimir Viktorovich Starichnev, Novolesnaya ulitsa, 18, korpus 1, kv. 128, Moscow, all of U.S.S.R.

Filed Oct. 25, 1974, Ser. No. 517,937
Int. Cl. F16k *31/169*
U.S. Cl. 137—494 **4 Claims**



1. A safety valve comprising: a valve body with an axial cavity, said valve body having an inlet chamber, a central hole and peripheral holes formed at one end thereof; a valve seat, having a face, located in said axial cavity and having a central hole and peripheral holes disposed coaxially with said central and peripheral holes formed in said valve body; a throttle, having a face, located in said valve seat and communicating with said inlet chamber through a central hole provided in said throttle and through the central hole in said valve seat; a ring, having a face, and having radial holes and arranged about a part of the external side surface of said valve seat, said ring being adapted to move along the side surface of the valve seat; outlet passages formed in the side wall of said valve body and arranged to communicate with the radial holes in said ring; a sealing ring arranged about the remaining part of the external side surface of said valve seat and adapted to be moved along the side surface of said valve seat by the pressure of the pressure fluid passing from the inlet chamber through said peripheral holes; a union having an axial cavity and fixedly mounted inside said valve body, and being arranged to fit against the base of said valve seat, said union having outlet passages formed in the side wall thereof communicating with said outlet passages in said valve body; a membrane located inside said union and arranged to be held against the face of said throttle, valve seat and ring, said membrane being adapted to be moved axially inside the union by the pressure of a working fluid; a sealing member located inside said union and seated on said membrane; a charging valve provided with a seal and accommodated inside said union at the end thereof opposite to said

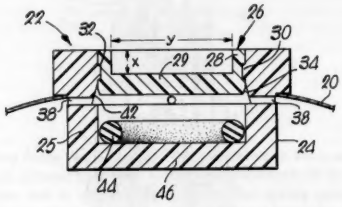
sealing member; a gas chamber formed by the union interior bounded by said sealing member and charging valve, and said gas chamber containing gas under pressure.

3,913,614

PRESSURE RELIEF STRUCTURE FOR AEROSOL CONTAINERS

Frank T. Speck, Gravois Mills, Mo., assignor to Fike Metal Products Corporation, Blue Springs, Mo.

Filed Oct. 9, 1973, Ser. No. 404,611
Int. Cl. B65d *51/16*
U.S. Cl. 137—543.19 **8 Claims**



1. Pressure relief structure for use with enclosures having pressurized materials therein, comprising:

a tubular housing formed of yieldable material with one end thereof adapted to sealingly engage said enclosure about an aperture in a wall of the latter, with the interior of said housing communicating with the interior of said enclosure;

shiftable sealing means formed of yieldable material and disposed in a normal sealing position within said housing with the leading face of said sealing means facing the interior of said enclosure,

said housing having a vent opening therein located at a position remote from the leading face of said sealing means;

means releasably retaining said sealing means in said normal sealing position and operable upon a rise of pressure within said enclosure to a predetermined magnitude to permit shifting of the sealing means away from the enclosure to a venting position wherein the interior of the enclosure is depressurized by virtue of communication between the latter and the atmosphere through said vent opening; and

means carried within said housing for return movement of said sealing means back toward said enclosure when the latter has been sufficiently depressurized,

the internal wall surface of said housing, and the periphery of the leading face of said sealing means, being cooperatively configured to interengage during said return movement to effect a resealing of said enclosure by virtue of the mutual sealing deflection of the yieldable housing and sealing means.

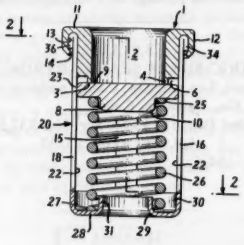
3,913,615

FLAT-LAPPED VALVE CARTRIDGE ASSEMBLY WITH CAGED POPPET

Roydon B. Cooper, Locust Valley, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,758
Int. Cl.² F16K *15/02*
U.S. Cl. 137—543.19 **3 Claims**

1. A relief valve assembly made entirely of metal and comprising, in combination, a metallic tubular support defining a relief valve passage therethrough and having at one end on an outer face thereof a valve seat, and at the other end an outwardly-projecting flange defining an annular recess between one face and the exterior of the tubular support and having an end portion projecting over the recess and forming a reentrant tip portion, the flange engaging and permanently and fixedly retaining a metallic poppet cage, the poppet cage being formed with a central annular body and a plurality of struts extending therefrom, each strut having an in-line end portion permanently bent upon itself in a 180° turn and having the tip end thereof snugly engaged and retained in the recess by the reentrant tip portion of the flange; a metallic valve poppet movable within the cage towards and away from the valve seat, to open and close the valve passage, the interior of the poppet cage closely abutting the outer periphery of the valve



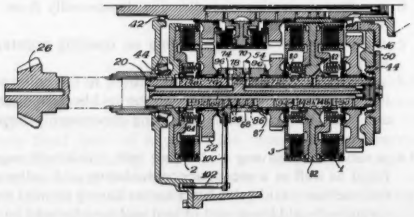
poppet and serving as a track along which the valve poppet slides in its movement toward and away from the valve seat; and a metallic coil spring within the cage retained at one end against the poppet-cage and at the other end against the valve poppet, biasing the poppet toward the valve seat, and retaining the poppet in a closed position at fluid pressures applied against the valve poppet up to a predetermined minimum, the valve poppet at fluid pressures in excess of said minimum overcoming the biasing force of the coil spring and moving away from the valve seat, to open the relief valve passage.

3,913,616

CLUTCH SHAFT WITH FLUID DISTRIBUTION MEANS

Joachim Horsch, Lombard, Ill., assignor to International Harvester Company, Chicago, Ill.

Filed May 20, 1974, Ser. No. 471,539
Int. Cl.² E03B *1/00*
U.S. Cl. 137—580 **2 Claims**



1. Deflectible, supporting, clutch shaft structure of an hydraulic type for rotatably supporting a set of friction engaging means in a transmission, said shaft being plural-passaged, and having a longitudinal axis and having:

longitudinal means in the shaft forming a plurality of fluid pressure control passages in the shaft generally adjacent its axis;

a supported, stationary sleeve manifold about the supporting shaft, said manifold having plural means of communication, registering therewith in said shaft, and being in communication therethrough with the passages in said shaft and floatingly related thereto so as to journal the latter in rows of bearing elements for relative rotation therein;

means supporting the shaft and sleeve manifold in the relationship described, including antifriction bearing elements at the ends of the shaft for rotation of the latter on its axis; and

a shifting connection between the supporting means and sleeve manifold, accommodating floating of the sleeve manifold with its freedom of movement limited thereby to making radial and longitudinal sleeve adjustment to shaft deflections as said rows of bearing elements constrain the manifold to centering itself;

said plural passaged shaft further having seals which are between said plural means of communication and between the shaft and sleeve manifold to keep the fluid in said passages separate;

said plural passaged shaft additionally having separate fluid flow means for providing said seals and said rows of bearing elements with lubricant.

3,913,617

APPARATUS FOR MIXING TWO GAS FLOWS

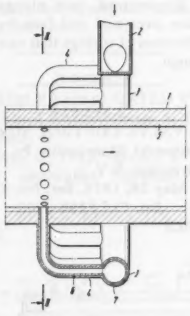
Jacobus van Laar, Santpoort; Jacob Felthuis, Oudorp; Hendrik Gustaaf Otto Weber, Heiloo, and Hendrik Olivierse, Beverwijk, all of Netherlands, assignors to Hoogovens Ijmuiden BV, Ijmuiden, Netherlands

Filed Nov. 19, 1973, Ser. No. 417,115

Claims priority, application Germany, Nov. 20, 1972, 2256814

Int. Cl.² F16K *19/00*

U.S. Cl. 137—599 **9 Claims**



1. In an apparatus for mixing two gas flows of greatly different temperatures, comprising a first conduit for a first gas flow and a second conduit for a second gas flow, said second conduit being formed as a ring main which at least partially surrounds said first conduit and which communicates with said first conduit via a plurality of circumferentially spaced connections, the improvement wherein said ring main is positioned with a radial spacing from said first conduit, said connections each comprise 90° pipe bends which extend from said ring main in axial direction relative to said first conduit and which open into said first conduit in radial direction thereof; and said first conduit, said pipe bends and said ring mains are each provided with a refractory lining.

3,913,618

VALVE

Robert Speedie, Carnegie, Australia, assignor to Illinois Tool Works Inc., Chicago, Ill.

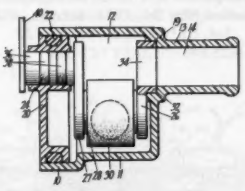
Filed June 5, 1974, Ser. No. 476,356

Claims priority, application Australia, June 13, 1973, 3648/73

Int. Cl. F16k *11/02*

U.S. Cl. 137—610 **4 Claims**

1. A valve comprising a housing having a valve chamber therein, first and second outlet passageways having inner ends which lead into said valve chamber, an inlet passageway intermediate said outlet passageways and having an inner end which leads into said valve chamber intermediate said inner ends of said outlet passageways, a crank comprising a crank pin, a first crank arm journalled in said housing and a second crank arm journalled in said inner end of said inlet passageway, said second crank arm having an inlet aperture there-



through which leads into said inlet passageway, a flexible roller on said crank pin which has a diameter sufficient to shut off the inner end of either of said outlet means and a control member secured to said first crank arm for controlling the position of said roller with respect to said inner ends of said outlet passageways so as to selectively control which of said outlet pipes is to receive flow therethrough.

3,913,619

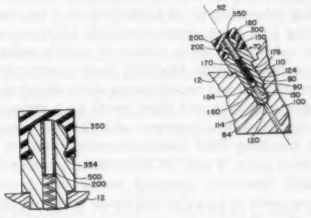
HYDRAULIC SYSTEM AIR BLEEDER VALVE ASSEMBLY WITH ANTIVIBRATION SPRING RETAINER

Marvin J. Aulner, Sr., 423 S. Rhode Island St., and Albert W. Aulner, 518 S. Denver St., both of Hastings, Nebr. 68901

Filed Mar. 1, 1974, Ser. No. 447,351

Int. Cl.² F16K *15/00*

U.S. Cl. 137—614.17 **8 Claims**



1. A combination closure and bleeder valve assembly for permanent mounting in the threaded bleeder outlet opening of a hydraulic system, said opening having an internal seat therein, said assembly comprising: an elongated body having a longitudinal axis, said body having a forward end having a closure surface symmetrical about said axis for seating against said seat, said body having a set of external threads intermediate the ends thereof, said body having a longitudinal bleeder passage extending from adjacent its outer end to a point which is adjacent its inner end but is spaced outwardly from said closure surface, said passage having an annular internal shoulder therin defining a spring check valve seat, a check valve in said passage adjacent said spring check valve seat, a compression spring in said passage and disposed rearwardly from said check valve, said body having a certain internal sidewall portion surrounding an outer portion of said passage, an elongated spring retainer in said outer portion of said passage and pressing transversely of and against said certain internal sidewall portion with a force sufficient for the purpose of anchoring said retainer in place against the force of said spring, said spring retainer being specifically an elongated roll-pin formed of resilient material and having a cross-section at any point along its length which is substantially C-shaped, said roll-pin

having a continuous slot extending from one end to the other thereof.

3,913,620

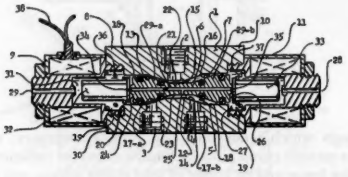
MOMENTARY CONTACT VALVE

Richard S. Pauliukonis, 6660 Greenbriar Drive, Cleveland, Ohio 44130

Continuation-in-part of Ser. No. 312,888, April 4, 1972. This application May 24, 1974, Ser. No. 473,186

Int. Cl.² F16K *11/06, 31/122*

U.S. Cl. 137—625.64 **4 Claims**



1. A momentary contact valve for selectively porting pressurized fluid from a source to a receiver comprising:

an elongated valve housing having first and second ends interconnected by a bore extending therethrough including a pair of inverted tapered valve seats comprising a part thereof located substantially midway therein with open receiver ends at each opposite housing bore end adaptable to receive solenoid operators, first port in said housing adaptable to be connected to a supply source entering said bore perpendicularly between said tapered valve seats for supply of the pressurized working fluid therein, second port in said housing adaptable to be connected to a first receiver entering said bore perpendicularly adjacent first tapered valve seat, third port in said housing adaptable to be connected to a second receiver entering said bore perpendicularly adjacent second tapered valve seat, valve means in said housing shiftable from a first position blocking fluid communication between said first and second ports while allowing fluid flow between said first and third ports to a second position allowing fluid flow between said first and second ports while blocking fluid communication between said first and third ports, a pair of diametrically opposite electric solenoid operators disposed inside said housing open receiver ends in an axial alignment with and on opposite sides of said valve means in an operable relationship therewith including means for maintaining said valve means in one of said positions and means for shifting said valve means from said first to second positions and vice versa when one of said solenoids is momentarily energized, means for substantially pressure forcing said valve means in one of said positions, including fluid operable means wherein said valve means include an internally piloted movable stem assembly in an axial alignment with said solenoids, having a reduced size center portion interconnecting two larger size valve members that provide opposing larger diameter outward end faces including larger size seals adjacent said end faces and two smaller size inward seals at said reduced size interconnection adjacent said center portion thereof, said outward end faces having large surface area at each stem end, said inward seals having smallest surface area of said valve members and said diametral difference between said larger and smaller diameter seals providing a differential area surface, said surface when exposed to pressure exerting end forces of different magnitude for shifting said valve means into said different directions when desired and for maintaining said valve means in at least one of said positions by a pressure force unbalance the fluid exerts on said valve means, said internal pilot of said stem assembly including a flow passage continuously communicating with said first fluid port inside said housing bore by way of a cross passage provided therein, said pilot passage exiting centrally at each of said end faces of said valve members into a solenoid cavity at solenoid open end opposite said solenoid exhaust apertures at each housing end, said solenoid operator cavities further including a spring loaded plungers axially movable therein between said end faces of said stem and a seat of said solenoid exhaust apertures in a dimensionally changing axial relationship which varies with the position said stem assembly assumes axially inside said valve housing bore during valve operation when one of said solenoid operators is energized electrically, said solenoid plungers thereby selectively moving between an open position spaced from said end faces of said valve members and defining a fluid cavity therebetwween and a closed position in blocking engagement with said end faces of said valve members while allowing said fluid cavity into atmospheric exhaust via said solenoid exhaust apertures, wherein when one of said solenoid operators is momentarily energized said plunger thereof being at a given axial distance between said end face of adjacent valve member and said solenoid exhaust seat is moved into said open position until said solenoid exhaust aperture is closed by said plunger and said solenoid cavity is pressurized by fluid exiting said pilot passage forcing said stem assembly to shift forward thereby increasing the axial distance between said plunger and said end face with resultant change in said axial relationship therein, and when said operator is deenergized, said plunger returns to said closed position over said end face by the spring action dictating utilization of springs that can tolerate said axial distance change.

3,913,621

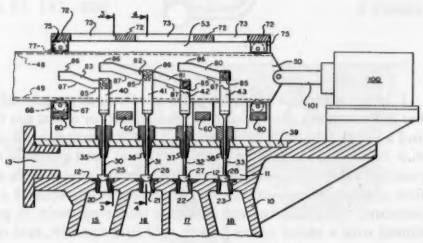
LINEAR VALVE CONTROL MECHANISM

Leonard P. Damratowski, Monroeville, Pa., assignor to Carrier Corporation, Syracuse, N.Y.

Filed May 29, 1974, Ser. No. 474,475

Int. Cl.² F16K *1/00*

U.S. Cl. 137—630.2 **6 Claims**



1. An actuating mechanism for regulating the flow of fluid through a linear series of admission valves including

a frame mounted adjacent to the valve series having two parallel rows of roller bearings supported within said frame, each bearing row being located within the linear plane described by the valve series,

a planar cam bar mounted for movement within said linear plane between the two parallel rows of bearings, the bar having two parallel opposed walls containing grooves being arranged to ride in moving contact with said two rows of bearings as said bar moves in said plane,

cam tracks formed in said bar, each track being operatively connected to one of said valves in said series for translating a lifting motion thereto, and

means to reciprocate said cam bar within said plane whereby said valves are opened and closed in a pre-

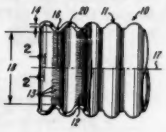
scribed order in response to the motion translated thereto by said cam tracks.

3,913,622

GAS CONDUIT AND METHOD OF MAKING SAME

Homer N. Holden, Sylva, N.C.; Morris Shokler; Sidney K. Lamden, both of Dayton, Ohio, assignor to Dayco Corporation, Dayton, Ohio

Filed Oct. 19, 1973, Ser. No. 408,023
Int. Cl. F16l *11/10, 11/12*
U.S. Cl. 138—121 7 Claims



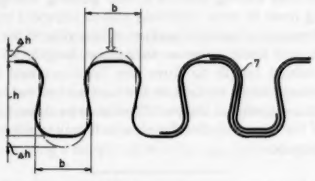
1. A flexible conduit composed of a single elastomeric tubular member having a smooth continuous outer surface and a roughened inner surface; said conduit having external and internal convolutions comprising alternating crests and troughs, the crests and troughs of the outer surface corresponding to the troughs and crests of the inner surface; said inner surface characterized by a plurality of substantially axially extending grooves; said conduit having a substantially uniform wall thickness, said grooves extending into said inner surface in an amount constituting only a small fractional portion of said wall thickness.

3,913,623

FLEXIBLE CORRUGATED TUBE

Emil Siegwart, Michael-Blatter-Strasse 6, D 6603 Sulzbach-Neuweiler, Germany

Filed Aug. 2, 1973, Ser. No. 377,984
Claims priority, application Germany, July 17, 1972, 2235012
Int. Cl.² F16L *11/16*
U.S. Cl. 138—122 1 Claim



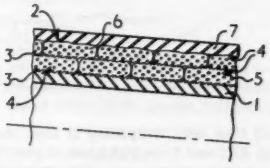
1. A flexible corrugated tube consisting of a succession of axially displaced convolutions obtained by spirally coiling a thin flexible metal strip formed with longitudinally extending corrugations, said corrugations being substantially of wave form, the waves having arcuate crests alternating with similarly shaped troughs, the borders of successive strip portions forming tube convolutions overlapping each other, with at least one trough, extending from one crest to another crest, and one crest, extending from one trough to another trough, of one corrugation in the overlapping border portion of a convolution fitting into one trough, extending from one crest to another crest, and one crest, extending from one trough to another trough, of a corrugation of the overlapped border portion of an adjoining convolution, characterized in that the width in cross section of at least those corrugations fitting into each other at said crests and at said troughs is greater than the width thereof at the portions thereof between said crests and said troughs so that said corrugations fitting into each other are interlocked to each other in the manner of hooks or teeth which engage each other.

3,913,624

FLEXIBLE REINFORCING STRUCTURES

Eric Ball, Newcastle-upon-Tyne, England, assignor to Dunlop Limited, London, England

Filed Apr. 14, 1972, Ser. No. 244,055
Claims priority, application United Kingdom, Apr. 21, 1971, 10342/71
Int. Cl.² F16L *11/08*
U.S. Cl. 138—132 11 Claims



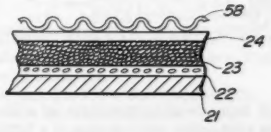
1. A flexible hose comprising:
a. an inner lining of polymeric material;
b. a flexible binding layer of polymeric material in strip form around the inner lining and having embedded therein an untwisted and non-woven plurality of reinforcement filaments extending longitudinally in the direction of the length of the strip and substantially parallel to the longitudinal axis of the strip, said plurality of filaments comprising a flattened group of filaments;
c. a support membrane of non-woven open structured randomly arranged filaments between the inner lining and the flexible binding layer of polymeric material, said membrane having no substantial reinforcing strength but serving only to support the flexible binding layer of polymeric material and to prevent cheese cutting of the inner lining by the strip on change in relative radial dimensions of the inner lining and strip;
d. said reinforcement filaments being located substantially directly on the non-woven support membrane.

3,913,625

POLY-POLYMER PLASTIC MATERIAL AND DEVICE MADE THEREFROM

Chester T. Gazda, Chicopee, and James M. Lalikos, Springfield, both of Mass., assignors to Titeflex, Springfield, Mass.

Filed June 14, 1972, Ser. No. 262,761
Int. Cl. F16l *9/14, 11/12*
U.S. Cl. 138—140 26 Claims

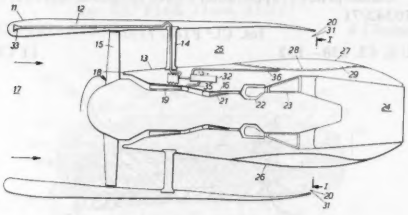


1. An abrasion resistant device comprising an inner tube for conveying fluid, said tube having thereover an outer plastic jacket providing an ablative scuff coating of a large volume of flame protective material, said material comprising sintered Teflon powder mixed with silicone rubber, said material experiencing a slow degradation of particles which carry off surface heat when subject to flame.

3,913,626
FLUID FLOW DUCTS

David Roberts McMurtry, Bristol, England, assignor to Rolls-Royce (1971) Limited, London, England

Filed Apr. 20, 1973, Ser. No. 352,921
Claims priority, application United Kingdom, Apr. 27, 1972, 19605/72
Int. Cl.² B05B 1/30; F15D 1/02
U.S. Cl. 138—37 6 Claims

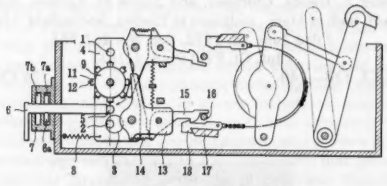


1. A fluid flow duct comprising at least one central wall defining the duct and for which there is provided a plurality of flow area varying means on said central wall therein, said flow area varying means each comprising one flexible sheet material flow area varying member, means for attaching said flow area varying members by their edges to the periphery of respective recesses in the central wall, said members being deployable in operation in either of two positions including a first concave position in which said members are received in the respective recesses and a second convex position, said members being substantially unstretched in either of said two positions, said second convex position being the mirror image of the first concave position and selectively varying the flow area through the duct, the separate fluid pressure means operable on said members for changing the position of said members between said first and second positions wherein fatigue in the unstretched members is substantially reduced.

3,913,627
HEALD FRAME LEVELING APPARATUS IN A DOBBY MACHINE

Tsutomu Goishihara, Seto, Japan, assignor to Yamada Dobby Co., Ltd., Nagoya, Japan

Filed July 9, 1974, Ser. No. 486,938
Claims priority, application Japan, July 13, 1973, 48-83660
Int. Cl.² D03C 1/14
U.S. Cl. 139—75 11 Claims

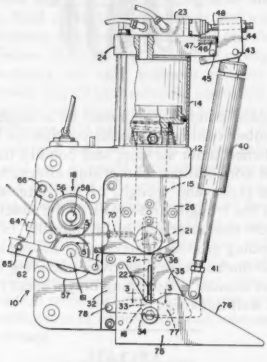


1. Heald frame leveling apparatus as utilized in a dobby machine in connection with weaving of a fabric by interlocking of hook elements, the combination comprising a card cylinder having card pegs, pivotally supported mounting members mounting said card cylinder, a rod element supported in a rod support, said rod element being movable into two fixed positions on said rod support to engage said mounting members and thereby establish two pivotal positions of said mounting members, one of said pivotal positions of said mounting members establishing one position of said card cylinder in which the interlocking action between said card pegs and said hook elements is established, the other pivotal position of said mounting members establishing another position of said card cylinder in which the interlocking action between said card pegs and said hook elements is released.

3,913,628
METHOD AND APPARATUS FOR HERMETICALLY SEALING A PACKAGE

Raymond J. Keating, Bettendorf; Lewis M. Shuh, Davenport, and Roy E. Wells, Maquoketa, all of Iowa, assignors to The Kartridg Pak Co., Davenport, Iowa

Division of Ser. No. 141,588, May 10, 1971, Pat. No. 3,793,688. This application Oct. 29, 1973, Ser. No. 410,532
Int. Cl.² B21F 45/16
U.S. Cl. 140—82 2 Claims



1. In an apparatus for forming U-shaped fasteners of metal wire for application as closures to the gathered mouth of a flexible packaging container wherein there is provided a forming anvil and a reciprocably mounted, co-operating forming punch with a knife for severing said wire in predetermined lengths, means for feeding said predetermined lengths of wire from a supply source to position the leading end thereof between the forming anvil and the punch which comprises a guide member having therein a wire guiding elongated bore extending from its wire receiving end to adjacent its wire exit end, said member having a surface at its exit end for co-operation with said knife to sever successive lengths of wire of a predetermined length to form the fasteners and a tapered ramp-forming inner surface at the exit end of said sleeve for causing the material at the cutoff point to be drawn toward the center of the wire and thereby eliminate any tendency to form a burr thereon.

3,913,629
INTERPOLE LOOP CONTROL DEVICE FOR COIL WINDING MACHINES

Vernon E. Kieffer, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 11, 1974, Ser. No. 441,024
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B21F 3/04
U.S. Cl. 140—92.1 13 Claims

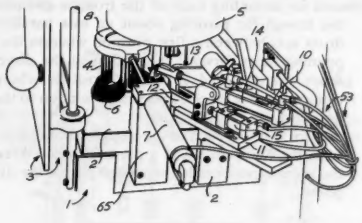
1. In a device for winding a plurality of wire turns into at least two interconnected coil sets, each of said coil sets defining a pole for dynamoelectric machine, including means for holding each coil set after it is wound, the improvement comprising means for preventing formation of interpole loops in the interconnection between said coil sets, said loop preventing means including means for grasping the most recently wound coil set upon the completion of winding said coil set, said grasping means being movable in two planes, said grasp-

ing means holding the wire turns comprising said last mentioned coil set until at least a portion of the plurality of turns forming the next sequential coil set is wound.

12. A loop control device for use in a coil winding machine comprising:

a base;

a first structure movably mounted to said base, said first structure having a first end and a second end;



power means mounted to said base and operatively connected to said first structure;

means mounted to the first end of said first structure for rotation in an arcuate path; and

second power means mounted to said first structure and operatively connected to said arcuately rotationally mounted means.

3,913,630

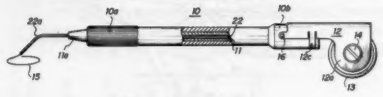
MANUAL STRINGER

Ulyss Ray Rubey, Lewisville, Tex., assignor to United Wiring & Manufacturing Co., Inc., Garland, Tex.

Filed June 20, 1974, Ser. No. 481,456

Int. Cl.² B21F *23/00*

U.S. Cl. 140—123 **7 Claims**



1. A wire stringing tool to be used in manually interconnecting component leads on an electronic circuit board, which comprises:

a handle having a smooth bore tunnel of substantially uniform diameter extending along its longitudinal axis from a wire storage end to a wire feeding tip;

a spool carrying a supply of wire for use in a stringing operation;

a spool housing rotatably carrying said spool and pivotally mounted on said handle at the wire storage end and including first and second extending fingers to clasp the handle thereby positioning said spool for discharge of a wire through the smooth bore tunnel; and

means for controlling drag opposing rotation of said spool.

3,913,631

AEROSOL DEVICE

Jean-Claude Guichard, Paris; Anne Gaillard, Ballancourt-sur-Essone, and Jean Marie Michel Paul Blainie, Paris, all of France, assignors to I.E.R.A.M. (Institut Europeen de Recherches et d'Applications Mediales), Paris, France

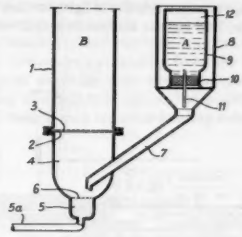
Filed June 20, 1974, Ser. No. 481,228

Int. Cl.² B65B *3/04*

U.S. Cl. 141—3 **14 Claims**

1. A method of filling an aerosol device, which includes a porous membrane disposed at one end of a pressure chamber, comprising the steps of:

injecting a gas at a determined flow rate into said pressure chamber upstream of the membrane,



wetting the membrane, and

admitting a predetermined quantity of liquid to be vaporized as a pressure drop occurs in the pressure chamber when the liquid dries off the porous membrane.

3,913,632

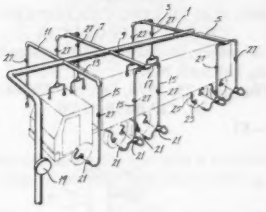
VEHICLE TIRE INFLATING SYSTEM

Walter H. Dudar, 1227 Levee St., Dallas, Tex. 75207

Filed Mar. 4, 1974, Ser. No. 447,498

Int. Cl.² B65B *3/04*

U.S. Cl. 141—95 **3 Claims**



1. A tire inflating unit for inflating the tires on a multiwheeled vehicle comprising a supply line for compressed air, a plurality of air passages connected to the supply line, a pressure regulator in the supply line and positioned to regulate the pressure in all said passages to the same predetermined amount, each of said passages terminating in at least one exit port, said passages extending longitudinally and transversely to position said exit ports adjacent to the wheels on a multiwheeled vehicle when said vehicle is positioned in said unit, each of said exit ports consisting of a quick-connect coupling unit adapted to open to permit passage of air from said supply line to a tire on said vehicle when coupled to a mating coupling connected to the valve of said tire.

3,913,633

LIQUID DISPENSING AND VAPOR RECOVERY SYSTEM

Trueman W. Hiller, Bettendorf, Iowa, assignor to Weil-McLain Company, Inc., Dallas, Tex.

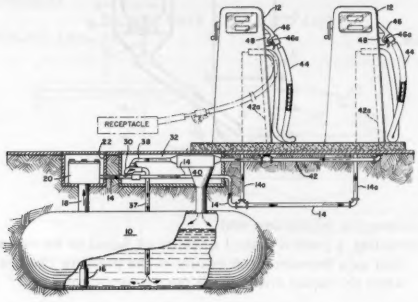
Filed Oct. 21, 1974, Ser. No. 516,738

Int. Cl.² B67D *5/04*

U.S. Cl. 141—45 **9 Claims**

1. A liquid dispensing and vapor recovery system comprising storage means for said liquid, first conduit means adapted to connect said storage means to receptacle, and pumping means for pumping said liquid from said storage means through said first conduit means and to said receptacle, wherein the improvement comprises second conduit means connected to said first conduit means and to said storage means for diverting a portion of said liquid in said first conduit means back to said storage means, means for forming a re-

duced pressure zone in said second conduit means in response to liquid flow through said second conduit means, a recovery vessel for receiving the vapors from said receptacle and separating said vapors into a relatively light portion and a relatively heavy portion, and means connecting said vessel to said reduced pressure zone for drawing the relatively light vapors from said vessel through said second conduit means for passage into said storage means, said recovery vessel being directly connected to said storage means for directly passing said relatively heavy vapors into said storage means.

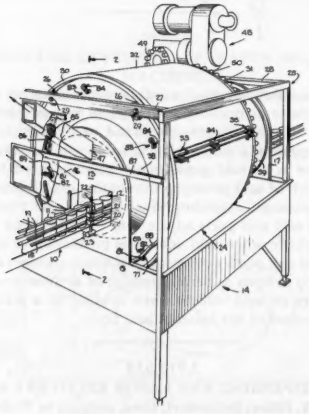


3,913,634

MACHINE FOR FILLING CONTAINERS WITH GRANULAR PRODUCTS

Bernard C. Eisenberg, Rockaway, N.J., assignor to Solbern Corporation, Fairfield, N.J.

Filed Jan. 25, 1974, Ser. No. 436,661
Int. Cl.² B65B *31/00*
U.S. Cl. 141—51 11 Claims



1. In a machine for filling containers with granular material of the type that includes means for conveying containers in a linear path, a drum surrounding a portion of the conveying means with the drum axis extending generally in the direction of the linear path, means supporting the drum for rotation about its axis, means for rotating the drum on its support means, means for delivering to the interior of the drum material to be placed in the containers, means spaced circumferentially around the inside of the drum for raising portions of the material in the drum to a preselected discharge point above the line of containers, means for discharging the material from the raising means at the discharge point, and means for directing the material discharged from the raising means to the containers as they are conveyed in the linear path, the improvement wherein

the means spaced circumferentially around the inside of the drum for raising portions of the material in the drum to a discharge point above the line of containers comprises:

a plurality of elongated troughs extending parallel to the drum axis in spaced relation around the drum adjacent to the inner surface of the drum,

means for mounting each of the troughs at each end of the trough for pivoting about an axis parallel to the drum axis between a first position wherein the trough opening faces forward in relation to the direction of drum rotation and a second position wherein the trough opening faces backward in relation to the direction of drum rotation, and

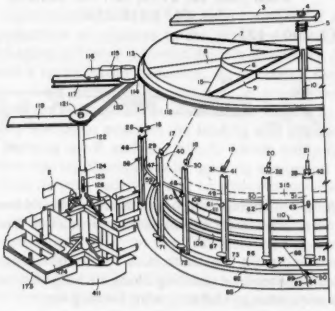
means for rotating each of the troughs about its pivot axis from the first position in a predetermined direction to the second position as the trough passes the discharge point.

3,913,635

BAG HOLDING AND FILLING DEVICE

Harold Seals, South Pittsburg, Tenn., assignor to Larry Harold Kline, Charleston, S.C.

Filed July 11, 1974, Ser. No. 487,447
Int. Cl.² B65B *1/30*
U.S. Cl. 141—83 18 Claims



1. A bag holding and filling device, for use with a revolving machine, for placing material into a bag, comprising:

a. bag clamping means, mounted independently of the physical structure of said revolving machine, operative to hold said bag onto said device;

b. pinch means, mounted independently of the physical structure of said revolving machine, physically connected to said bag clamping means operative to control the flow of said material into said bag, whereby when said pinch means allows said material to flow into said bag, said bag clamping means will hold said bag onto said device and when said pinch means does not allow said material to flow into said bag, said bag clamping means will release said bag.

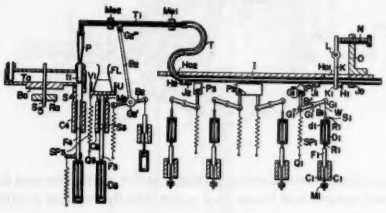
c. a lever rod directly physically connecting said bag clamping means to said pinch means.

3,913,636

APPARATUS FOR AUTOMATICALLY DISTRIBUTING A DETERMINED AMOUNT OF LIQUID

Ei Mochida, 5-4, 2-chome, Komagome Toshima-ku, Tokyo, Japan

Filed Apr. 10, 1974, Ser. No. 459,688
Claims priority, application Japan, Apr. 10, 1973, 48-48040543
Int. Cl.² B67C 3/00
U.S. Cl. 141—130 4 Claims



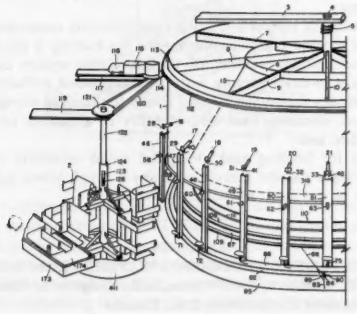
1. An apparatus for automatically distributing a predetermined amount of liquid from a liquid supply container into each one of a plurality of containers comprising in combination: a tube made of flexible and resilient material and disposed along a flat plate, an end-opened pipette connected to the downstream end of the tube, upstream blocking means closing the tube, a primary push plate between the pipette and the upstream blocking means arranged to reciprocate between an operative position where the push plate presses a section of the tube against the flat plate and an inoperative position where the push plate is away from the tube which allows the tube to return to its original shape, an auxiliary push plate adjacent the primary push plate constructed and arranged to squeeze the tube after the primary push plate moves to its operative position to ensure discharge of the liquid in the pipette, and driving means for moving the pipette between the liquid supply container and the plurality of containers into which the liquid in the supply container is to be distributed.

3,913,637

REVOLVING BAGGING MACHINE

Harold Seals, Aiken, S.C., assignor to Larry Harold Kline, Charleston, S.C.

Filed July 11, 1974, Ser. No. 487,532
Int. Cl.² B65B 1/04, 3/04
U.S. Cl. 141—151 139 Claims



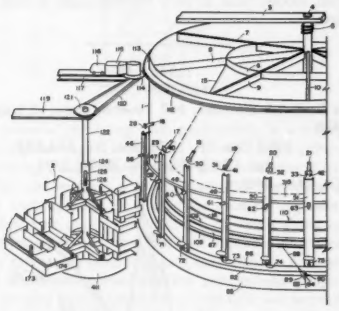
1. A machine for placing material in bags comprising:
a. machine revolving means operative to revolve said machine;
b. material holding means in which said material may be held;
c. material bagging means operative to place said material, held in said material holding means, into said bags;
d. machine support structure operative to physically support said machine, said machine support structure comprising a center shaft extending from the top to the bottom of said machine and upper supporting structure supporting said machine above the position where said material, held in said material holding means, enters said bags.

3,913,638

TAKE-OFF DEVICE

Harold Seals, South Pittsburg, Tenn., assignor to Larry Harold Kline, Charleston, S.C.

Filed July 11, 1974, Ser. No. 487,448
Int. Cl.² B65B 3/04, 1/04
U.S. Cl. 141—151 31 Claims



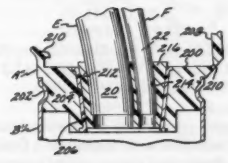
1. A take-off device for use with a revolving machine for removing bags of material from said revolving machine comprising:
a. revolving means operative to revolve said take-off device at a speed proportionate to the speed of revolution of said revolving machine;
b. a plurality of bag carrying means on said take-off device operative to support said bags when said bags are taken from said revolving machine;
c. positioning means operative to place said plurality of bag carrying means on said take-off device in proper position to remove said bags from said revolving machine.

3,913,639

AUTO POLLUTION GASOLINE TANK CAP ASSEMBLY

Edwin R. Davis, 29041 Aloma Ave., Laguna Niguel, Calif. 92677

Filed Dec. 4, 1974, Ser. No. 529,357
Int. Cl.² B65B 3/04; B67C 3/34
U.S. Cl. 141—285 8 Claims



1. In combination with a valved nozzle that includes a first tube having a free bayonet like end portion through which a volatile liquid fuel may be discharged into a fill line of a fuel

tank, said fill line having a free end, and said nozzle including a second tube having a free bayonet like end portion laterally spaced from said first tube through which fuel vapor may flow to a recovery area, a cap assembly mounted on said free end of said fill tube, said cap assembly including:

a. a body mounted on said free end of said fill line, said body having at least one opening extending therethrough;

b. movable closure means on said body that may be moved from a first to a second position to seal said opening to prevent escape of fuel vapor from said fill line to the ambient atmosphere during the time fuel is stored in said tank;

c. first means for removably holding said closure means in said second position; and

d. second means for removably effecting a seal between said opening and said bayonet like end portions of said first and second tubes when said closure means is in said first position to permit said liquid fuel to discharge into said fill line through said first tube and fuel vapor displaced from said tank during the filling thereof to discharge into said second tube to flow therethrough to said recovery area.

3,913,640

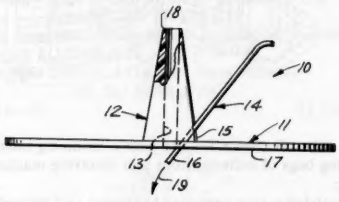
SIPHON DISC

Oliver Roderick Dressler, 447 Emerald Ave., El Cajon, Calif. 92020

Filed Oct. 15, 1974, Ser. No. 514,657

Int. Cl.² B65B *3/00*; B67C *3/00*

U.S. Cl. 141—392 **2 Claims**



1. A syphon disc device, comprising in combination, a circular flat disc for placement over a container into which a liquid is intended to be syphoned, a hollow cone affixed upon said disc providing means for attachment to a vacuum hose, a plastic tube carried by said disc and said cone providing flow transfer means for said liquid into said container which is non-collapsible, said cone being affixed upon a center of said disc, said cone having a longitudinal central opening aligning with a similar opening through said disc, said vacuum hose being removably secured over a small end of said cone, said tube extending angularly through a base of said cone and angularly through said disc, a projecting lower end of said tube being aligned with an axis of an tangential edge of said longitudinal opening through said cone and disc.

3,913,641

TREE CLIPPER

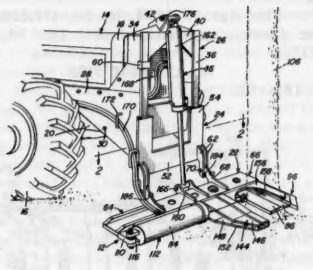
Idas B. White, 602 S. Main St., Blountstown, Fla. 32424

Filed Feb. 11, 1974, Ser. No. 441,313

Int. Cl.² A01G *23/08*

U.S. Cl. 144—34 E **21 Claims**

1. A tree clipper comprising a clipping blade, said blade being moveably mounted with respect to a fixed anvil means, fluid operated cylinder and piston means interconnecting said blade and anvil means, guide means adapted to be fixedly attached to a vehicle, a carriage reciprocally mounted with respect to said guide means, means mounting said anvil means on said carriage for movement therewith, and fluid pressure cylinder and piston means adapted to be attached to a vehicle at an upper end portion and connected to the anvil means at a lower end portion to raise and lower the carriage, anvil means and blade, lock the anvil means and blade in substantially horizontal tree cutting position at the earth line and fold the navil means and blade to a substantially vertical position when raising.



3,913,642

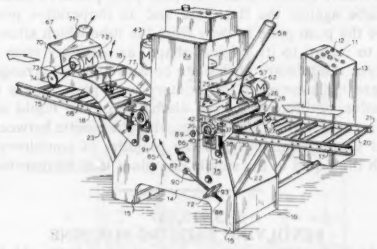
WOOD CUTTING APPARATUS

Donald C. Porter, Clermont, Fla., assignor to Airko Manufacturing Company, Clermont, Fla.

Filed Dec. 23, 1974, Ser. No. 535,663

Int. Cl.² B27C *1/00*

U.S. Cl. 144—114 R **29 Claims**



1. An apparatus for cutting patterns into wood comprising in combination:

a frame;

rotatable cutter casing means rotably supported by said frame;

a plurality of rotatable cutting blades rotably connected to said rotable cutter casing means for cutting a piece of wood during rotation of said rotatable cutter casing means to cut a varying pattern in said wood surface;

feed means supported by said frame for feeding elongated wood members past said plurality of rotatable cutting blades; and

means for holding said elongated wood members while cutting a pattern therein whereby a rough hewn surface can be cut upon a wooden surface.

3,913,643

APPARATUS FOR PRODUCING WAFERS FROM WOOD

Robert D. Lambert, Fort Wayne, Ind., assignor to Multiply Development Corporation, Ltd., Canada

Filed Feb. 19, 1974, Ser. No. 443,500

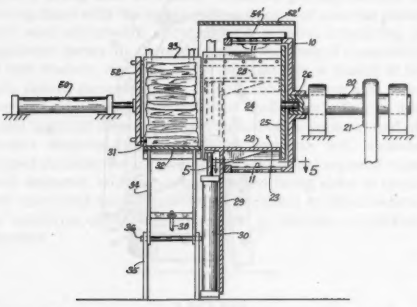
Int. Cl.² B27C *1/00*; B65B *69/00*

U.S. Cl. 144—172 **18 Claims**

1. An apparatus for cutting wafers from a wood supply comprising:

rotary means for cutting wafers from across the grain of said supply including a rotating drum open at one end and perforated with rows of slots substantially parallel to the grain of the wood; knives mounted on the inner periphery of said drum and projecting inwardly from the leading edges of said slots;

a platform radially movable within said drum receiving said wood supply; and



means for radially extending said platform toward the periphery of said rotating drum to bring the wood supply into contact therewith and for radially retracting said platform from the periphery of said drum to receive additional wood,

whereby said knives cut said wafers from said supply, said wafers passing through said slots to the outer periphery of said drum.

3,913,644

DEBARKING MACHINE

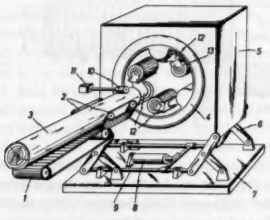
Alfons Braun, Neusass, Germany, assignor to Maschinenfabrik Braun KG, Germany

Filed Apr. 19, 1974, Ser. No. 462,499

Claims priority, application Germany, Apr. 21, 1973, 2320450

Int. Cl.² B27L *1/00*

U.S. Cl. 144—208 E **14 Claims**



1. A debarking machine comprising an annular debarking rotor rotating about a log to be debarked and having arms for pivoting about pivot axes located parallel to the rotor axis to press against the log in radial directions relative to the rotor axis, said arms including substantially cylindrical-roller-shaped debarking tools rotating about axes located substantially parallel to the rotor axis, and said pivoting arms being respectively rotatable about rotational axes extending approximately normal to said pivot axes, said rotational axes being respectively orientated substantially in the longitudinal direction of the pivoting arms.

3,913,645

CLAMPING MECHANISM FOR BLADES IN ROTARY MATERIAL REMOVING TOOLS

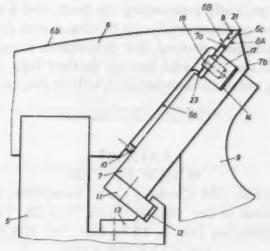
Gerhard Maier, Brackwede, Germany, assignor to Maschinenfabrik B. Maier KG, Brackwede, Germany

Filed July 30, 1974, Ser. No. 493,062

Claims priority, application Germany, Aug. 3, 1973, 2339325

Int. Cl.² B27G *13/00;* **B26D** *1/12*

U.S. Cl. 144—218 **10 Claims**



1. In a material removing tool, particularly in a rotary toc for removing shavings from wood, a combination comprisin a holder having a supporting surface and an abutment extend ing beyond said surface; a substantially flat blade having a elongated cutting edge, a rear edge located opposite sai cutting edge, two major surfaces one of which abuts agains said supporting surface, and first and second cam faces; an means for releasably retaining said rear edge in engagemer with said abutment, including first and second projection provided on said holder adjacent to said first and second car faces, at least said first projection being movable with respec to said holder and said retaining means further comprisin means for biasing said first projection against said first car face with a predetermined force having a first componen which urges said second cam face against said second projec tion and a second component which urges said rear edg against said abutment due to engagement of said cam face with the respective projections, said blade being separabl from said holder upon movement of said first projection awa from said first cam face against the opposition of said biasin means.

3,913,646

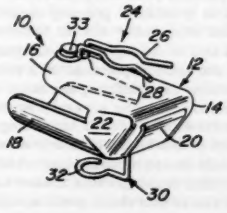
FINGERTIP NUT AND BOLT HOLDING TOOL

Robert E. Grayson, Rte. 2, South, Great Falls, Mont. 59401

Filed May 9, 1974, Ser. No. 468,578

Int. Cl.² B25B *9/00*

U.S. Cl. 145—46 **5 Claim**



1. A fingertip nut and bolt holding tool, comprising, ir combination:

a. support means for embracing the tip of a finger, the support means including a substantially U-shaped member forming a thimble-like finger-engaging socket, and

having a web and a pair of opposed legs connected to the web and arranged extending co-directionally from the web, one of the legs being disposable adjacent the pad of the associated finger, and the other of the legs being provided with a projection arranged extending away from both of the legs;

b. holder means mounted on the support means for selectively engaging an item and retaining same on the support means, the holder means including spring means mounted on the legs of the support means for grippingly retaining a bolt, the spring means comprising a resilient wire eye-hook arranged cantilever mounted on the one of the legs and for partially embracing the bolt, and a substantially U-shaped resilient wire clip having a web portion retentively wrapped around the projection provided on the other of the legs and having further legs arranged for gripping between themselves a bolt or nut being retained.

3,913,647

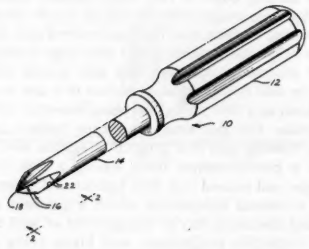
SCREW DRIVER

Edward T. Arnn, 505 Country Lane, Louisville, Ky. 40207

Continuation of Ser. No. 473,840, May 28, 1974. This application July 8, 1974, Ser. No. 486,487

Int. Cl.² B25B *15/02*

U.S. Cl. 145—50 A **2 Claims**



1. A screw driver comprising a shank portion terminating in four blades integral therewith, each of said blades tapering, diminishing in thickness, as it extends downwardly to form a point at an extension of the longitudinal axis of said shank portion and each terminating in a lower foot engageable with the bottom portion of a slot of a cross slotted screw head, each of said feet portions protruding outwardly from its respective blade faces to provide a gripping means engageable with opposed sides of a screw slot to removably hold a screw thereon and also to cut a groove in the parallel sidewalls of a screw-head slot upon application of a torque to said shank, said feet portions each defining the lower most portion of its respective blade and being generally isosceles trapezoidal in transverse cross section with its base being most remote from said extension of said longitudinal axis of said shank and lying in an outwardly bowed arcuate plane which extends from the periphery of said shank portion toward an extension of the longitudinal axis of said shank portion, each of said feet portions intersecting with the other feet portions to form a point and each having its inwardly tapered sidewalls extending along the entire length of its respective blade to be engageable with the parallel sidewalls of a screw head slot, said base of each of said feet portions and its respective inwardly tapered sidewalls defining wedge-like bites comprising said gripping means.

3,913,648

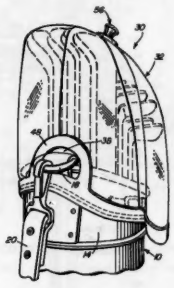
GOLF CLUB BAG COVER

Stanley S. Sessler, Siloam Springs, Ark., assignor to Geraldine W. Sessler, Broken Arrow, Okla., a part interest

Filed June 7, 1974, Ser. No. 477,521

Int. Cl.² A63B *55/00*

U.S. Cl. 150—1.5 R **12 Claims**



12. In combination with a golf club bag having an open end defined by a rim, a cover comprising a flexible canopy having a peripheral edge substantially greater in length than said rim, an elongated reinforcing border element secured to said peripheral edge having a bag contacting portion and a displaceable flap portion, flexible means extending from the bag contacting portion of the border element into embracing relation to the bag adjacent the rim for anchoring the canopy to the bag, and means mounted on the flap portion of the border element for holding the canopy in enclosing relation to the open end of the golf bag.

3,913,649

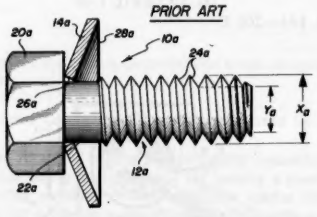
FASTENER ASSEMBLY

Peter P. Stanaitis, Rockford, Ill., assignor to Textron Inc., Providence, R.I.

Filed Feb. 14, 1974, Ser. No. 443,136

Int. Cl.² F16B *39/24*

U.S. Cl. 151—38 **13 Claims**



1. A threaded fastener unit for engagement with an internally threaded element, said unit comprising a screw member having a washer preassembled thereon prior to formation of the external thread on said member, said screw member having a driving head and an elongate shank, said shank including an unthreaded portion and a threaded portion having an external thread formed thereon in accordance with industry specified dimensions and tolerances, for engagement by an element having a standard internal thread formed in accordance with said industry specified dimensional tolerances, said unthreaded portion being disposed intermediate the driving head and said threaded portion, and an apertured, compressible washer element carried on said screw member proximate the unthreaded portion thereof, said washer element including a dish-shaped portion and an aperture, the minimum internal dimensions of said washer aperture being less than the major

dimension of the external thread on said threaded portion thereby to maintain said washer in assembled relation with said screw member, and said unthreaded portion including a reduced diameter neck segment immediately adjacent said threaded portion, and said diameter of said neck section being less than the minimum minor diameter of the thread form of the internally threaded element to be engaged with said externally threaded portion, such that said element may be advanced along said externally threaded portion toward the driving head with the internal thread form of said nut passing over said unthreaded neck segment without interfering engagement therewith, thereby to effect the desired compression of said washer, whereby when said fastener is seated in tension, failure thereof is more likely to occur across said thread than at said neck, said unthreaded section including an additional segment disposed adjacent said neck segment and of a greater diameter than said neck segment, with arcuately shaped shoulder means joining said additional segment to said neck segment, said additional segment being sized to receive said apertured washer in overlying relation to effect substantial centering of said washer relative to the axis of said screw member.

3,913,650

ANTISKIDDING DEVICE FOR MOTOR VEHICLE TIRE

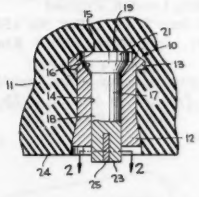
Usko Martti Johannes Salakari, 21500 Piikkio, Finland

Filed Nov. 28, 1973, Ser. No. 419,877

Claims priority, application Finland, Nov. 28, 1972, 3355/72; Nov. 28, 1972, 3356/72

Int. Cl.² B60C *11/16*

U.S. Cl. 152—210 **6 Claims**



1. A tire stud assembly capable of being imbedded in an elastomeric ground wheel tire, comprising a stud having an elongated cylindrical shank portion for extending outwardly of the tire at its outer end and an enlarged head portion at its inner end, said head portion tapering toward said shank portion, an elongated sleeve member completely surrounding said shank portion of said stud thereby spacing said shank portion from said tire, said sleeve member being open-ended and having an axial and cylindrical through opening of a diameter substantially equal to the diameter of said stud, said sleeve member having a length slightly less than the length of said stud, and said sleeve member embracing said shank portion along said sleeve member opening, outwardly extending means on said sleeve for engaging the tire so as to anchor said sleeve in place, said sleeve having an enlarged head portion with an interior recess at its inner end surrounding and slightly spaced from said stud head portion, said stud extending outwardly of the tire, and said stud head portion having an enlarged flat inner end received in said recess and contacting engagement with a portion of the tire, whereby said stud is capable of sliding movement inwardly of said sleeve as its outer end is made to contact the ground upon rotation of the wheel, and is capable of limited sliding movement outwardly of said sleeve against the action of the tire portion.

3,913,651

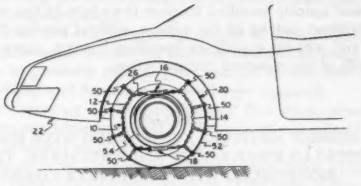
QUICKLY INSTALLED TIRE CHAIN

George H. Stonack, Puyallup, Wash., assignor to Max L. Morton, Puyallup, Wash.

Filed Oct. 23, 1973, Ser. No. 408,674

Int. Cl.² B60C *27/06*

U.S. Cl. 152—213 R **1 Claim**



1. A quickly installed traction tire chain of essentially two principal counter balanced tire chain portions, made of standard components, and installed by using draping, throw through and dual tightening procedures, all performed from a position alongside the outside of the mounted tire and wheel on a vehicle, comprising:

a. two principal alike counter balanced standard tire chain portions having standard cross tire chain portions and therefore being entirely composed of all standard traction tire chain components;

b. interconnector receiving means on both said counter balanced chain portions located at their respective top inside chain end and top outside chain end, and bottom inside chain end and bottom outside chain end;

c. various interconnectors for joining the said two principal alike counter balanced standard tire chain portions at their said respective interconnector receiving means, these said various interconnectors comprising, in turn;

1. a short continuous length of standard tire chain serving to connect the said two principal alike counter balanced standard tire chain portions, using the said interconnector receiving means at the then arranged opposite spaced top inside chain ends, such connection occurring during the manufacture of the said quickly installed traction tire chain;

2. a hook and standard short continuous length of standard tire chain, having at the outset a removable throw through lightweight standard chain portion, all arranged as a sub assembly, serving, after draping of the said quickly installed traction tire chain, to connect the said two principal alike counter balanced standard tire chain portions, using the said interconnector receiving means at the then arranged opposite spaced bottom inside chain ends;

3. a top outside turnbuckle, turnbuckle locking means, and a standard very short continuous length of standard tire chain, all arranged as an interconnector sub assembly, serving, before the draping of the said quickly installed traction tire chain to preliminarily connect the said two principal alike counter balanced standard tire chain portions, using the said interconnector receiving means at the then arranged opposite spaced top outside chain ends; and

4. a bottom outside turnbuckle, turnbuckle locking means, and a standard very short continuous length of standard tire chain, all arranged as in interconnector subassembly, serving, after both the draping of the said quickly installed traction tire chain and the throwing through of the light weight standard chain portion, to preliminarily connect the said two principal alike counter balanced standard tire chain portions, using the said interconnector receiving means at the then arranged opposite spaced bottom outside chain ends; and

thereafter, equally spacing the standard cross tire chain portions of each principal alike counter balanced standard tire chain portion while at the same time acquiring and maintaining the opposite balancing positions of these said counterbalanced standard tire chains portions, and then equally tightening the said top outside and bottom outside turnbuckles of each interconnector sub assembly of a turnbuckle, turnbuckle locking means, and a standard very short continuous length of standard tire chain, to complete the very tight engagement of the said quickly installed traction tire chain to the mounted tire without jacking up the vehicle, without moving the vehicle, and without leaving an installing position alongside the outside of the mounted tire and wheel.

3,913,652

RUBBER ARTICLES REINFORCED WITH HIGH MODULUS FIBER CORDS AND PNEUMATIC TIRES REINFORCED WITH SUCH FIBER CORDS

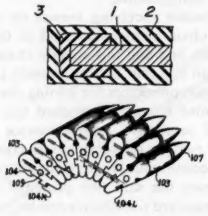
Takaaki Imamura, Akigawa; Masayuki Matsui, Kodaira; Seisuke Tomita, Higashi-Murayama; Masahiro Makita, Kodaira; Tsunemasa Nakajima, Higashi-Murayama; Koji Chiba, Higashi-Yamato, and Nobuyoshi Shimazaki, Kodaira, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

Filed May 31, 1973, Ser. No. 365,680

Claims priority, application Japan, June 1, 1972, 47-53840

Int. Cl.[2] B60C *9/18, 9/02, 13/00*

U.S. Cl. 152—361 R **5 Claims**



1. In a pneumatic tire including breaker, carcass and chaffer members, the improvement characterized by at least one member selected from the group consisting of the breaker, carcass and chaffer members comprising high modulus fiber cords having a Young's modulus of not less than 4.0×10^5 Kg/cm², said fiber cords being covered in the vicinities of their ends with a rubber containing synthetic polyisoprene having not less than 90 percent by weight of cis-1,4-isoprene unit, the amount of said synthetic polyisoprene being not less than 20 percent by weight of the total rubber hydrocarbon.

3,913,653

PNEUMATIC TIRES

Henri Verdier, Beauregard-L'Eveque, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, France

Continuation of Ser. No. 145,336, May 20, 1971, abandoned. This application Apr. 9, 1973, Ser. No. 349,399

Claims priority, application France, May 29, 1970, 70.19928

Int. Cl.[2] B60C *5/16*

U.S. Cl. 152—397 **2 Claims**

1. The combination for construction vehicles of a pneumatic tire having integral metal bead seats and a cylindrical rim base, which combination comprises

1. a large size tubeless tire comprising

a. a tread portion,

b. two sidewalls, one on each side of said tread portion,

c. two beads separate from each other terminating said sidewalls,

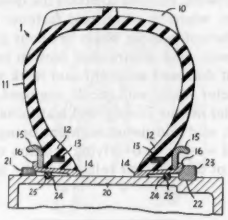
d. a metal core inside each bead which makes it practically unstretchable, and

e. separate metal bead seats integral with and permanently attached to each of the two beads of the tire, said metal bead seats having a cylindrical portion on their inner face for resting on and slidable along a cylindrical rim base, and

2. a cylindrical rim base comprising

f. a cylindrical support,

g. two annular grooves in said cylindrical support,



h. a separate gasket in each of said annular grooves, and

i. means for locking said tire on to said cylindrical rim base,

said tire being lockably mounted on said cylindrical rim base so as to have said separate gaskets beneath each of said integral metal bead seats and thereby assure air tightness between said cylindrical rim base and said integral metal bead seats of said tire.

3,913,654

PNEUMATIC TIRES

Tom French, Sutton Coldfield, England, assignor to Dunlop Holdings Limited, London, England

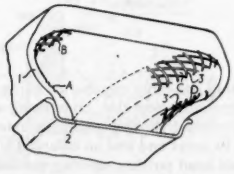
Filed June 7, 1971, Ser. No. 150,560

Claims priority, application United Kingdom, June 20, 1970, 30032/70

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B60C *17/00*

U.S. Cl. 152—330 L **10 Claims**



1. A pneumatic tire and wheel assembly capable of being run in a deflated condition comprising:

a. a wheel rim having a pair of annular flanges;

b. a pneumatic tire mounted on the wheel to define an inflation chamber and having a tread portion with a width greater than the width of the wheel rim measured between the flanges;

c. means to prevent the tire from becoming dislodged from the wheel rim when running deflated;

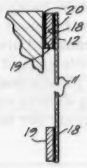
d. the entire interior surface of the tire and the inflation chamber being free of intermediate supporting structure so that when the assembly is run deflated, opposed internal surfaces of the tire come into contact;

e. a plurality of lubricant retaining portions recessed into said internal surface in at least one localized region thereof in which a lubricant material can be held so that opposed internal surfaces when brought into contact can be lubricated during rotation of the tire under load.

3,913,655
TEMPORARY CURTAINS

Toshio Ogino, 1440 Kathleen Way, Elk Grove Village, Ill. 60007

Filed July 18, 1973, Ser. No. 380,192
Int. Cl.² E06B 3/92
U.S. Cl. 160—84 R 2 Claims

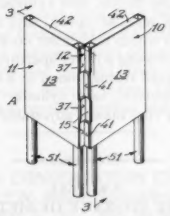


1. A temporary drapery assembly comprising, in combination, a sheet of paper drapery material having a top and a bottom, and a pair of stiffening strips, each of which comprises a length of easily cuttable multi-sheet paper laminate stiffening material having a back and a front surface coated on one of said surfaces with an adhesive, at least one of the stiffening strips being coated on both of said surfaces with adhesive, the adhesive being covered by a removable paper strip, the stiffening strips dimensioned to be attachable to the drapery material adjacent a top and a bottom edge of the drapery material to stiffen the same, the attachment being by the adhesive, the stiffening material having a thickness from the back to the front surface at least twice the thickness of the drapery material whereby, when attached to the drapery material, the stiffening strips function to stiffen the top and bottom edges of the drapery material while providing weight to the bottom edge of the drapery material to keep the drapery material taught between the stiffening strips.

3,913,656
HINGED PANELS

Reynolds Guyer, 1954 Edgecumbe Road, St. Paul, Minn. 55116

Filed Jan. 24, 1973, Ser. No. 326,524
Int. Cl.² A47G 5/00
U.S. Cl. 160—135 11 Claims

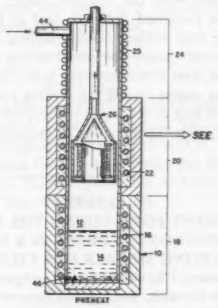


1. A foldable panel structure including:
a pair of rigid generally rectangular panels having opposed parallel surfaces and connecting edges of substantially uniform thickness,
a unitary hinge structure including a first face panel portion secured to one of said parallel surfaces of a first of said pair of generally rectangular panels extending to one edge of said one parallel surface,
a first hinge panel foldably connected to said first panel portion along a fold line extending along said one edge of said one parallel surface,
said first hinge panel being substantially coextensive in width to the thickness of said rigid generally rectangular panels,
a second hinge panel foldably connected to said first hinge panel along a line parallel with said first named fold line, said second hinge panel being substantially coextensive in width to said first hinge panel,
a second face panel portion fringedly connected to said second hinge panel along a fold line parallel to said previously mentioned fold lines,
means securing said second face panel portion to a corresponding parallel surface the second of said generally rectangular panels,
a series of slits extending at right angles to said fold lines and extending across both of said first and second hinge panels in generally right angular relation to said fold lines, dividing said hinge panels into hinge segments,
means securing the portions of said first hinge panels of alternate hinge segments to the edge of one of said pair of generally rectangular panels,
means securing the portions of said second hinge panels of the remaining alternate segments to the edge of the other of said pair of generally rectangular panels, whereby
said rectangular panels may fold through substantially 180°.

3,913,657
METHOD AND APPARATUS FOR FABRICATING A COMPOSITE STRUCTURE CONSISTING OF A FILAMENTARY MATERIAL IN A METAL MATRIX

John G. Banker, Kingston, and Robert C. Anderson, Clinton, both of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 17, 1974, Ser. No. 489,215
Int. Cl.² B22D 19/02, 23/00, 27/16
U.S. Cl. 164—62 10 Claims



1. A method for preparing a composite structure consisting of filamentary material within a metal matrix, comprising the steps of confining the metal for forming the matrix in a first chamber, heating the confined metal to a temperature adequate to effect melting thereof, introducing a stream of inert gas into said chamber for pressurizing the atmosphere in said chamber to a pressure greater than atmospheric pressure, confining the filamentary material in a second chamber, heating the confined filamentary material to a temperature less than the temperature of said metal, evacuating said second chamber to a pressure less than atmospheric, placing said second chamber in registry with said first chamber to provide for the forced flow of the molten metal into said second chamber by the differential pressure in the chambers to effect infiltration of the filamentary material with the molten metal, and thereafter cooling the metal infiltrated-filamentary material to form said composite structure.

3,913,658
ADJUSTABLE PLATE MOLD FOR CONTINUOUS CASTING

Markus Schmid, Zurich, Switzerland, assignor to Concast AG, Zurich, Switzerland

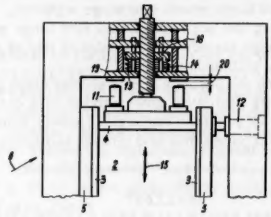
Filed Mar. 2, 1973, Ser. No. 337,442

Claims priority, application Switzerland, Mar. 3, 1972, 3114/72

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B22d *11/00*

U.S. Cl. 164—280 **7 Claims**



7. In an adjustable plate mold for continuous casting, comprising a support frame having at least one stop surface, a mold formed by longitudinal walls and transverse walls clamped between the longitudinal walls for limiting a mold compartment thereof, said longitudinal walls and transverse walls being supported by the support frame, adjustment means provided for at least one of the transverse walls, said adjustment means being supported by the support frame, said adjustment means being connected with said at least one transverse wall and with the support frame, exchangeable stop gauge means provided between said at least one transverse wall and the stop surface, and coupling means provided for said adjustment means for interrupting the connection between said at least one transverse wall and the support frame, said coupling means during the casting operation allowing for movement of said at least one transverse wall with respect to the stop surface in the direction of the mold compartment and back again.

3,913,659
ARRANGEMENT FOR GUIDING THE MOVABLE PLATE OF A HORIZONTAL PRESS IN A MACHINE FOR CASTING METALS IN A CHILL MOLD

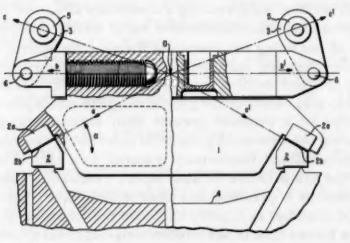
Pierre Chatourel, Chaville, France, assignor to Regie Nationale Des Usines Renault, Boulogne-Billancourt, France

Filed Jan. 25, 1974, Ser. No. 436,677

Claims priority, application France, Feb. 1, 1973, 73.03510

Int. Cl.² B22D *17/00*; **F16C** *17/22*

U.S. Cl. 164—303 **4 Claims**



1. In a machine for casting metals in a chill mold characterized by a horizontal press having a stationary die part, in which an injection tube is received, and a movable die plate, the improvement comprising:

a guide bed;

a pair of horizontal slides on said guide bed for supporting said movable plate;

a pair of horizontal guiding columns disposed above said movable plate and generally oriented in the same direction as said pair of slides;

a pair of linking members being respectively pivotally secured at an upper end thereof to different ones of said pair of guiding columns and pivotally secured at a lower end thereof to opposite ends of said movable plate;

whereby said movable plate is suspended from said linking members while being slidably supported on said horizontal slides to compensate for heat expansion of the die parts.

3,913,660
CHILL MOLD FOR CASTING PISTONS

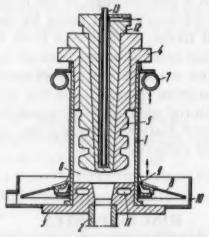
Adolf Diez, Bad Friedrichshall-Kochendorf, Germany, assignor to Karl Schmidt GmbH, Neckarsulm, Germany

Filed Nov. 9, 1973, Ser. No. 414,494

Claims priority, application Germany, Nov. 14, 1972, 2255644

Int. Cl.² B22D *27/04*

U.S. Cl. 164—348 **4 Claims**



1. Chill mold comprising cylinder means for casting piston blanks having an inserted inner core means reproducing the inner contours of the piston, said cylinder means being surrounded by conical annular apron, said cylinder having an upper aperture into which said inner core means is inserted, said cylinder means having a lower aperture placed on a correspondingly constructed fitting joined to a riser tube of a low-pressure casting furnace, said cylinder means being surrounded by a spray ring means adjustable in height carrying cooling water.

3,913,661
LOW PRESSURE STORAGE OF METABOLICALLY ACTIVE MATERIAL WITH OPEN CYCLE REFRIGERATION

Stanley P. Burg, Miami, Fla., and William J. Hentschel, Acton, Mass., assignors to Grumman Allied Industries Inc., Garden City, N.Y.

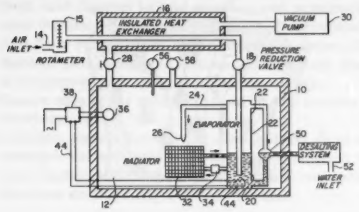
Division of Ser. No. 215,688, Jan. 5, 1972, Pat. No. 3,810,508. This application Mar. 26, 1974, Ser. No. 454,825

Int. Cl. F24f *3/14*

U.S. Cl. 165—3 **13 Claims**

1. The method of open cycle conditioning of the interior of a closed chamber comprising flowing outside atmospheric air into the interior of said chamber while reducing its pressure and contacting it with a body of water to provide a cooling capacity consequent to expansion of said flowing air and evaporation of said water and, while maintaining both the rate of flow of air and pressure drop at selected constant values to

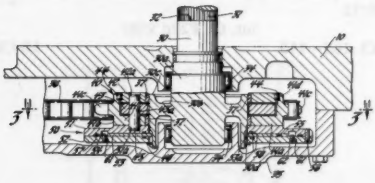
provide cooling capacity in excess of that required to maintain the internal temperature of said chamber at a desired temperature, controlling the temperature of the flowing air in said chamber by heating said air and said body of water.



3,913,662
REGENERATOR DRIVE ASSEMBLY

Leonard C. Davis, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed July 5, 1974, Ser. No. 485,912
Int. Cl. F28d *19/00*
U.S. Cl. 165—8 **4 Claims**



1. A rotary regenerator including a housing, a drive shaft rotatably journalled in said housing, a matrix disk supported at one end of said drive shaft in driven engagement therewith, a driven sprocket means encircling said drive shaft adjacent the opposite end thereof, said sprocket means being connectable to a driven roller chain and journalled on said drive shaft for relative rotation with respect to said drive shaft, a torsion spring partly encircling said drive shaft and connected at one end to said sprocket means and at its other end to said drive shaft, and a viscous damper means operatively connected to said sprocket means and to said drive shaft whereby said spring and said viscous damper means effect a parallel connection between said sprocket means and said drive shaft.

3,913,663
ENERGY CONSERVATION CHAMBER

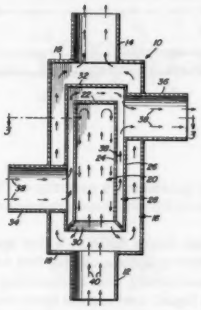
Jack R. Gates, 2527 W. Water, Springfield, Mo. 65802

Filed May 3, 1974, Ser. No. 466,858
Int. Cl.² F28F *9/22*
U.S. Cl. 165—102 **7 Claims**

1. An energy conservation system in the form of a heat exchange apparatus, comprising, in combination:

a. an outer chamber having spaced, opposed ends, and provided with an inlet opening in one of the ends and an outlet opening in the other of the ends, the inlet opening and outlet opening arranged for passing a first flow of gas through the outer chamber;

b. an inner chamber including a continuous wall disposed within the outer chamber and having spaced opposed ends arranged opposite the ends of the outer chamber, the one of the ends opposite the inlet opening of the outer chamber being an opening end in spaced alignment with the inlet opening of the outer chamber, and the other of the ends, arranged opposite the outlet opening of the otuer chamber, being a closed end, the opening end receiving the first flow of gas from the inlet opening, the closed end reversing the flow of gas and returning the gas along the continuous wall to the open end, and the first flow of gas further flowing from the open end to the outlet end of the outer chamber; and

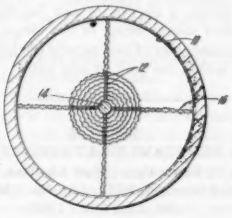


c. an intermediate chamber having an inner wall common with the inner chamber, and an outer wall disposed between and spaced from the inner wall and the outer chamber, the intermediate chamber being sealed relative to the inner chamber and the outer chamber and provided with an inlet aperture and an outlet aperture, both apertures arranged for passing a second flow of gas through the intermediate chamber.

3,913,664
SELF-FILLING ARTERIAL HEAT PIPE

John G. Roukis, Syosset; Robert L. Kosson, Massapequa, and John R. Westell, Huntington Station, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Jan. 12, 1973, Ser. No. 322,964
Int. Cl. F28d *15/00*
U.S. Cl. 165—105 **25 Claims**



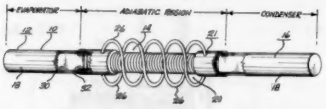
1. A heat pipe having a closed casing, a wall capillary and vaporizable liquid carried thereby and including at least one supported axially disposed artery formed by a plurality of screen layers that are separated by spacing means to provide a spacing of said screen layers which will permit capillary filling of said artery and longitudinal flow of vaporizable liquid, said supported axially disposed artery having a plurality of screen mesh legs that act as support means.

3,913,665

EXTERNAL TUBE ARTERY FLEXIBLE HEAT PIPE

James L. Franklin, Bellevue, and John T. Pogson, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 1, 1973, Ser. No. 402,655
Int. Cl.[2] F28D 15/00
U.S. Cl. 165—105 1 Claim



1. A heat pipe containing a quantity of fluid and being an airtight enclosure composite structure comprising in combination:

a. first enclosure means defining a first space and a second space, said first space containing first internal conductor means for containing and transporting the fluid therethrough as a liquid, said second space being a passageway for containing and transporting the fluid therethrough as a vapor;

b. second enclosure means operatively connected to said first enclosure means and having a flexible passageway disposed adjacent to said second space of said first enclosure means so as to allow the fluid to move from said second space of said first enclosure means into said second enclosure means as a vapor;

c. third enclosure means comprising a third space and a fourth space operatively connected to said second enclosure means, said third space containing second internal conductor means for containing and transporting the fluid therethrough as a liquid, said fourth space being a passageway disposed adjacent to said second enclosure means so as to allow the fluid to move from said second enclosure means into said fourth space of said third enclosure means as a vapor; and,

d. flexible external capillary conduit means operatively connected to said first enclosure means and to said third enclosure means, said flexible external capillary conduit means having its ends disposed adjacent to said first internal conductor means and said second internal conductor means so as to allow the fluid to move from said second internal conductor means to said first internal conductor means through said flexible external capillary conduit means, a portion of said flexible external capillary conduit means being in the shape of a helix, said flexible passageway of said second enclosure means being disposed within the coils of said helix.

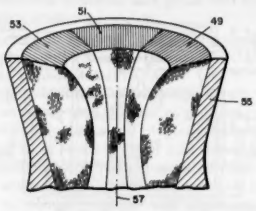
3,913,666

HEAT RESISTANT WALL CONSTRUCTION

Peter Bayliss, 10 Idalia Court, San Anselmo, Calif. 94960

Filed Mar. 20, 1972, Ser. No. 236,274
Int. Cl. F02k 11/00
U.S. Cl. 165—106 10 Claims

1. A wall structure forming a heat resistive surface, comprising a plurality of bundles of quills, each quill being characterized by uni-directional properties along its length, each of said plurality of bundles including a large number of straight quills immersed in a matrix material to form a three-dimensional solid structure with said quills parallel to each other in a plane cutting across more than one bundle, said bundles being attached to one another with an acute angle in said plane between their respective parallel quills to form said wall and said heat resistive surface, wherein said bundles are oriented with respect to said heat resistive surface wth at least one quill of each bundle being perpendicular thereto in said plane, whereby the quill density and resulting heat conductive and



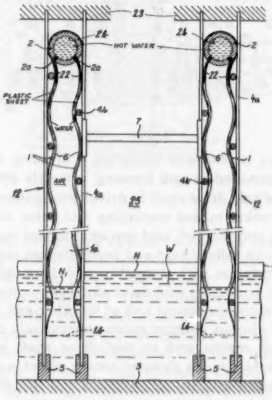
ablative properties remain uniform at various distances away from the heat resistive surface.

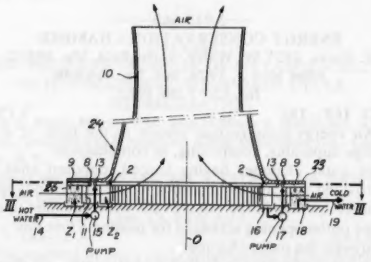
3,913,667

HEAT EXCHANGER

Jean-Luc Ch. Meylan, Geneva; William H. Frost, Grand-Lancy, Geneva, and John G. Meier, Geneva, all of Switzerland, assignors to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Filed Sept. 21, 1973, Ser. No. 399,513
Claims priority, application Switzerland, Sept. 22, 1972, 13899/72
Int. Cl. F28d 9/00
U.S. Cl. 165—115 10 Claims





1. A heat exchanger for establishing thermal contact between a first and a second fluid of different temperatures, at least said first fluid being a liquid, comprising:

a plurality of spacedly juxtaposed hollow wall members each including a generally horizontal elevated support and an envelope of plastic sheet material suspended from

said support, said envelope comprising a pair of confronting sheets separated by an airspace;

conduit means for said first fluid terminating in a channel on said support, the latter being provided with gaps leading from said channel to said airspace and terminating adjacent the inner surfaces of said sheets for distributing said first fluid substantially uniformly along upper edge portions of said sheets and letting said first fluid descend in a continuous film along said inner surfaces;

collector means for said first fluid at the bottom of said envelope; and

circulation means for driving said second fluid through passages between said wall members in contact with the outer surfaces of their sheets for thermal interaction with the films on the inner surfaces thereof.

3,913,668

MARINE RISER ASSEMBLY

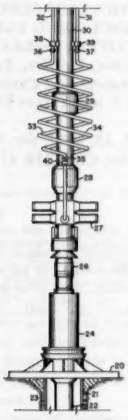
William W. Todd, Stavanger, Norway; William T. Ilfrey, and James R. Lloyd, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Aug. 22, 1973, Ser. No. 390,679

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² E21B *7/12*

U.S. Cl. 166—.5 **9 Claims**



1. A marine riser assembly for use in offshore drilling operations which comprises a riser pipe, a ball joint in said riser pipe near the lower end thereof, and steel kill and choke lines extending down said riser pipe to points below said ball joint, said kill and choke lines being attached to said riser pipe at points above said ball joint and including helical sections which extend around said ball joint and adjacent portions of the riser pipe above and below said joint through an angle of at least about 360° and contain coils having inside diameters from about 1.25 to about 4 times the outside diameter of said ball joint.

3,913,669

METHOD OF INSTALLATION AND CONTROL OF UNDERWATER EQUIPMENT

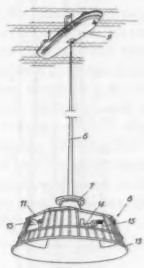
André Brun, Paris, France; Albert Jaffe, and Philippe de Panafieu, both of London, England, assignors to Subsea Equipment Associates Ltd., Hamilton, Bermuda

Filed Dec. 27, 1972, Ser. No. 318,977

Claims priority, application France, Dec. 27, 1971, 71.46720

Int. Cl.² E21B *33/035*

U.S. Cl. 166—.6 **10 Claims**



1. A method of installing underwater petroleum production equipment capable of operating at great depth, said method comprising the steps of:

1. lowering a guide structure from a surface support by means of a manipulator attached to a pipe column;
2. attaching said guide structure to a wellhead of an underwater oil well by means of said manipulator;
3. lowering a first unit from said surface support onto said guide structure by means of the or a further manipulator, said first unit
   a. being provided with a guide structure ensuring guiding of a second unit to be recited,
   b. being adapted to ensure continuity of the production passage in said wellhead to said second unit, and
   c. being adapted to control the closing and opening of said production passage;
4. attaching said first unit to said guide structure;
5. lowering a second unit from said surface support onto said first unit by means of a tool-carrier frame or a work crew, said second unit being adapted to ensure the operation of a production wellhead, the approach of said second unit to said first unit being effected by
   a. attaching the or a further manipulator to said tool-carrier frame by a mechanical connection enabling displacement of said tool-carrier frame relative to said manipulator,
   b. maneuvering said manipulator above the guide structure provided on said first unit,
   c. lowering said manipulator and said tool-carrier frame onto the guide structure provided on said first unit,
   d. resting said tool-carrier frame on a support plate, and
   e. ensuring alignment and joining up of said first and second units by the simple approach of said second unit to said first unit and by displacement of said manipulator relative to said tool-carrier frame; and
6. attaching said second unit to said first unit.

3,913,670

APPARATUS FOR SETTING AND LOCKING PACKING ASSEMBLIES IN SUBSURFACE WELLHEADS

Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.

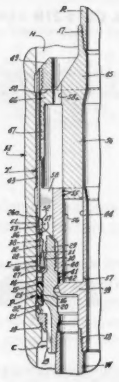
Filed May 28, 1974, Ser. No. 474,019

Int. Cl.² E21B *33/12*; **F16L** *35/00*

U.S. Cl. 166—182 **28 Claims**

1. Apparatus for effecting a seal between a wellhead and a hanger disposed in the wellhead for supporting a tubular pipe

string extending into a well bore comprising: a running tool having a body structure connectable to a running pipe string; packing means; means releasably connecting said packing means to said body structure to enable saaid packing means to be set in sealing relation to the hanger in response to longitudinal movement of said body structure and released from said body structure; locking means for locking said packing



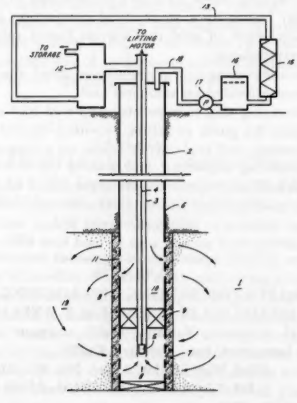
means in sealing relation to the hanger including a locking member actuatable longitudinally to lock said locking means; said body structure having an area responsive to pressure in said wellhead to move said body structure longitudinally to set said packing means; and said body structure having actuator means movable longitudinally relative to said packing means to move said locking member longitudinally.

3,913,671

RECOVERY OF PETROLEUM FROM VISCOUS PETROLEUM CONTAINING FORMATIONS INCLUDING TAR SAND DEPOSITS

David Arthur Redford, Fort Saskatchewan, Canada, and Joseph Columbus Allen, Bellaire, Tex., assignors to Texaco Inc., New York, N.Y. and Texaco Exploration Canada, Calgary, Canada

Filed Sept. 28, 1973, Ser. No. 401,734
Int. Cl.² E21B *43/24*
U.S. Cl. 166—252 **10 Claims**



1. In a method of recovering viscous petroleum including bitumen from a subterranean, viscous petroleum-containing formation including tar sand deposits, said formation being penetrated by at least two spaced apart wells, at least one of which is an injection well and at least one of which is a production well in fluid communication with the lower portion of the formation, said process being of the type wherein a fluid is injected via said injection well into the petroleum formation for the purpose of increasing the mobility of the petroleum contained therein, wherein the improvement for removing immobile hydrocarbon deposits from the formation in the vicinity of the production well, which deposits are obstructing the flow of petroleum mobilized by the fluid injected into the formation via the injection well are obstructing the flow of petroleum into the production well comprises:

a. providing a liquid injection flow path from the surface separate from the production flow path of the production well and adjacent thereto, said injection means being in fluid communication with the upper portion of the viscous petroleum-containing formation near the production well;

b. injecting an aqueous heating liquid into the upper portion of the viscous petroleum-containing formation in the vicinity of the production well at a pressure less than the pressure at which fluid is injected into the injection well to mobilize viscous petroleum, said heating liquid being injected via said liquid injection flow path adjacent the production well, said liquid being capable of increasing the mobility of the immobile hydrocarbon materials in the vicinity of the production wellbore; and

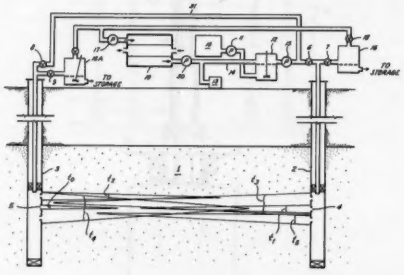
c. recovering the injected aqueous heating liquid, mobilizing fluid and formation petroleum from the lower portion of the formation via the production well.

3,913,672

METHOD FOR ESTABLISHING COMMUNICATION PATH IN VISCOUS PETROLEUM-CONTAINING FORMATIONS INCLUDING TAR SANDS FOR OIL RECOVERY OPERATIONS

Joseph Columbus Allen, Bellaire, Tex., and David Arthur Redford, Fort Saskatchewan, Canada, assignors to Texaco Inc., New York, N.Y. and Texaco Exploration Canada, Calgary, Canada

Filed Oct. 15, 1973, Ser. No. 406,421
Int. Cl.² E21B *43/00*
U.S. Cl. 166—263 **27 Claims**



1. In a method of recovering viscous petroleum including bitumen from a subterranean, viscous petroleum-containing formation including a tar sand deposit, said formation being penetrated by at least one injection well and by at least one production well, said method being of the type wherein a fluid is injected into the injection well for the purpose of increasing the mobility of the viscous petroleum contained in the formation, the improvement for creating a permeable, fluid communication path between the injection well and production well which comprises,

a. fracturing the formation adjacent to at least one of the wells by hydraulic fracturing and injecting into the fractured zone a propping agent to establish a permeable,

propped fracture zone extending at least a portion of the way into the tar sand deposit toward the other well;

b. injecting into the propped fractured zone via the well adjacent thereto, a solvent for the formation petroleum selected from the group consisting of aromatic hydrocarbons, carbon tetrachloride, halogenated hydrocarbons which are essentially unreactive with and insoluble in water, carbon disulfide, and mixtures thereof, said solvent having dissolved therein a substantial amount of gas at a preselected pressure;

c. terminating injection of the gas-containing solvent after the injection pressure has reached a preselected value; and

d. reducing the pressure in the well adjacent to the propped fracture zone into which the gas-containing solvent has been injected, to permit the flow of solvent, petroleum and gas into the well and to the surface of the earth.

3,913,673

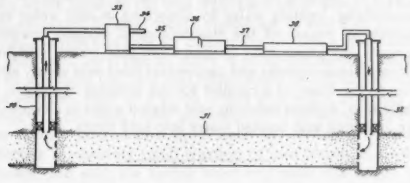
OIL RECOVERY PROCESS WHICH PROVIDES FOR THE TREATMENT OF PRODUCED WATER BEFORE IT IS REINJECTED TO DRIVE OIL TOWARD THE PRODUCTION WELLS

Ernest C. Barber, Valhalla, N.Y., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 199,777, Nov. 17, 1971, Pat. No. 3,844,942. This application June 3, 1974, Ser. No. 475,363

Int. Cl.² E21B *43/00*; B01J *9/04*

U.S. Cl. 166—266 **2 Claims**



1. A process for the recovery of oil from subterranean formations comprising:

a. injecting water into the formation via an injection well;

b. producing a mixture of oil and sour water contaminated with hydrogen sulfide through a production well;

c. separating the oil and sour water contaminated with hydrogen sulfide;

d. dissolving a catalytic amount of a soluble transition metal salt in the hydrogen sulfide ladened water;

e. introudcing the hydrogen sulfide ladened water and catalyst into a covered container which is gas tight and is at atmospheric pressure;

f. introducing an amount of oxygen into the water in the container which is at least stoichiometric with the amount of hydrogen sulfide dissolved in the water;

g. dissolving the oxygen in the water by mixing to effect a reaction between the oxygen and hydrogen sulfide;

h. collecting any hydrogen sulfide which evolves from the water in the container;

i. dissolving this collected hydrogen sulfide into water from said covered container containing dissolved catalyst in a second container;

j. dissolving sufficient additional oxygen into the water in the second container to at least stoichiometrically convert all the said collected hydrogen sulfide to elemental sulfur, and

k. repeating steps h through j in additional containers, as needed, until essentially all of the hydrogen sulfide is reacted; and

l. injecting the hydrogen sulfide free water into the formation as in step (a).

3,913,674

WATERFLOODING METHOD USING OVERBASED SULFONATE

Delmar D. Krehbiel, Lubbock, Tex.; M. Duane Gregory, Ponca City, Okla.; Charles R. Clark, Ponca City, Okla., and Carl D. Kennedy, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 323,608, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 207,988, Nov. 24, 1971, abandoned. This application Sept. 6, 1974, Ser. No. 503,829

Int. Cl.² E21B *43/22*

U.S. Cl. 166—270 **11 Claims**

11. In a process for recovering hydrocarbons from petroliferous formations wherein anionic waterflood additives, injected into a formation through well bores, are employed to displace such hydrocarbons from the formations the improvement therein comprising employing an overbased sulfonate as the anionic waterflood additive, said overbased sulfonate being derived from a cracked refinery distillate stream having a boiling range in the range of about 300° to about 610°F and containing an excess of base component required to neutralize the suflonic acid precursor of said sulfonate such that the ratio: "weight of excess base component/weight of sulfonate" is about 0.03 to about 2.0.

3,913,675

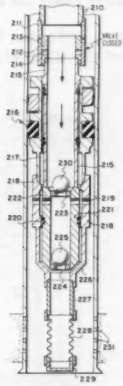
METHODS AND APPARATUS FOR SAND CONTROL IN UNDERGROUND BOREHOLES

Kenneth E. Smyrl, Marrero, La., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 21, 1974, Ser. No. 516,250

Int. Cl.² E21B *43/04*

U.S. Cl. 166—278 **9 Claims**



1. Apparatus for placing an aggregate pack in a wellbore about a sandscreen, said apparatus comprising:

elongated tubular packer mandrel means adapted for attachment to standard well conduit;

packer means removably secured to said mandrel means, adapted for expansion into sealing contact with a borehole wall;

elongated tubular lower housing means attached to said packer means;

said housing means adapted to receive a sand control screen in attachment thereto;

first ported valve means above said packer means adapted to selectively communicate the bore passage of said mandrel means with the wellbore annulus;

second ported valve means below said packer means adapted to communicate said mandrel means bore passage with the wellbore annulus;

shearable valve means shearably located in said mandrel means below at least a portion of said packer means and above said second ported valve means; and,

checkvalve means below said shearable valve means;

said mandrel means arranged in sealingly slidable telescopic engagement in said housing means.

9. A method of placing an aggregate pack around a sand-screen in a wellbore, said method comprising:

placing in the wellbore a conduit string having a permanent hydraulic packer, a permanent tubular housing, a removable tubular mandrel inside the packer and housing, a check valve in lower end of the mandrel, valve means below the packer, and a sand control screen below the housing;

closing the bore through the mandrel below the packer;

applying hydraulic pressure to the conduit string to actuate the packer;

shearing the bore closure below the packer from the mandrel;

injecting a slurry containing a carrier fluid and an aggregate material into the conduit string and through the valve means into the wellbore around the sand-screen;

squeezing the slurry to force the carrier fluid into the formation and the aggregate to pack in the wellbore;

removing the mandrel and conduit string from the wellbore; and,

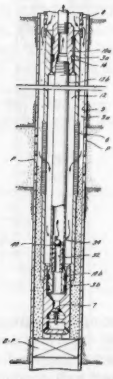
lowering a production string through the packer into sealing engagement in the housing below the valve means thereby opening a flow communication bore from the sandscreen through the production string.

3,913,676

METHOD AND APPARATUS FOR GRAVEL PACKING

John P. Barbee, Jr., Luling, and Charles A. Richard, Gretna, both of La., assignors to Baker Oil Tools, Inc., Los Angeles, Calif.

Filed June 19, 1974, Ser. No. 480,737
Int. Cl.² E21B *43/04*
U.S. Cl. 166—278 **14 Claims**



1. An apparatus for use in a subterranean well having a production zone and fluid in said well, comprising: isolation means for isolating the production zone from the fluid in the well above the zone, said means defining first and second fluid passages communicating with the zone and having means adapted to receive first and second tubular strings extending from said means to the top of the well; a liner assembly carried by and depending from said isolation means, said assembly including a first perforated member through which fluid can flow between the exterior and the interior of said member, said assembly having means for providing fluid in communication with said first fluid passage and the exterior of said perforated member; a second tubular member within said liner assembly providing a fluid passageway communicating with said second fluid passage and communicable with the interior of said perforated member; and means for selectively controlling fluid flow in said passageway.

14. A method for gravel packing a production zone in a well comprising the steps of: running a well packing mechanism with a perforated liner depending therefrom in the well and setting said mechanism in the well above the production zone; providing first and second fluid passages extending within the well packing mechanism; providing first and second tubular strings communicating with said first and second fluid passages, respectively, and extending to the top of the well, said first fluid passage extending into the perforated liner, said second fluid passage communicating with the exterior of the perforated liner; pumping fluid containing gravel down one of said strings and through its associated fluid passage into the zone surrounding the perforated liner, the fluid in advance of the fluid containing gravel and in the zone surrounding the perforated liner flowing through the other fluid passage and the other of said strings to the top of the well.

3,913,677

TREATMENT OF OIL WELL STRATA

Dwight D. Collins, Bakersfield, Calif., assignor to Chemsoil Corporation, Bakersfield, Calif.

Filed Aug. 6, 1973, Ser. No. 385,887
Int. Cl.² E21B *43/24*
U.S. Cl. 166—307 **7 Claims**

1. The method of treating oil-bearing strata in oil wells comprising: treating water by absorbing in said water sulfur dioxide in excess of the stoichiometric amount needed to remove any elementary oxygen from said water, and to remove all bicarbonates and carbonates from said water, adding iron to the water as a catalyst for the removal of oxygen, and thereafter, without exposing said treated water to oxygen or to air, injecting said treated water into said strata.

3,913,678

METHOD AND COMPOSITION FOR TREATING A WELL TO PREVENT THE FORMATION OF SULFUR AND SCALE DEPOSITIONS

Floyd E. Blount, Dallas, Tex.; Reinhard F. Becker, Hamburg, Germany; Siegfried Lechler, and Helmut Ockelmann, both of Celle, Germany, assignors to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 5, 1974, Ser. No. 458,143
Int. Cl.² E21B *43/00*
U.S. Cl. 166—310 **6 Claims**

1. A method of producing a sour gas and water having scale-forming ions from a subterranean formation penetrated by a well having tubing therein, said sour gas containing in said formation under reservoir conditions of temperature and pressure sulfur dissolved therein in an amount sufficient to result in the deposition of elemental sulfur in said well as the temperature and pressure of said sour gas decrease during flow of said gas up said well, comprising:

a. producing said sour gas and said water from said formation via said tubing, whereby an acidic environment is provided in said tubing and elemental sulfur is deposited in said tubing;

b. circulating down said well and up said tubing a chemical that forms a polysulfide with hydrogen sulfide and sulfur to dissolve and remove said sulfur from said tubing; and

c. circulating down said well and up said tubing said chemical also reducing the acidic environment in said tubing thereby causing precipitation of scale from the water being produced in said tubing another chemical that is capable of forming a chemical complex with said ions of said water to mitigate the precipitation of scale in said tubing.

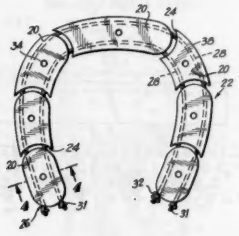
3,913,679
HORSESHOE CAPABLE OF ADAPTING TO HOOF GROWTH AND IMPACT

Louis Bucalo, Holbrook, N.Y., assignor to Shods Incorporated, Holbrook, N.Y.

Continuation-in-part of Ser. No. 329,861, Feb. 5, 1973, Pat. No. 3,841,408. This application Oct. 11, 1973, Ser. No. 405,439

Int. Cl.² A01L *1/04*

U.S. Cl. 168—8 **12 Claims**



1. A horseshoe comprising a series of tiles arranged in a row in substantially end-to-end relation and forming a substantially U-shaped assembly partly extending around a given area corresponding to the central area at the bottom surface of a hoof, said tiles being spaced slightly from each other along said row and defining between themselves along said row a series of gaps which separate the tiles from each other along said row, and elongated flexible means connected to said tiles and extending across said gaps for connecting the tiles to each other, so that each tile is free to move in all directions with respect to an adjoining tile, said tiles respectively having substantially flat surfaces, each of a given length and width, normally located in a common plane and adapted to be situated next to the bottom surface of a hoof, each tile having a thickness which is a relatively small fraction of said length and width thereof, and each tile having inner and outer side edges, the width of which substantially equals said thickness, respectively directed toward and away from said given area.

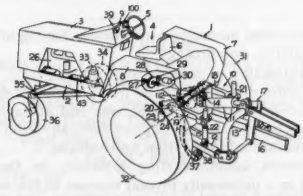
3,913,680
CONTROL SYSTEM FOR PERCENTAGE OF WHEEL SLIPPAGE OF A TRACTOR

Richard G. Carlson, Greendale, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Division of Ser. No. 300,715, Oct. 25, 1972, Pat. No. 3,834,481. This application May 30, 1974, Ser. No. 474,674

Int. Cl.² A01B *41/06*

U.S. Cl. 172—2 **10 Claims**



1. A tractor comprising, a three point hitch adapted for connection to an implement, a pair of lower draft arms in said three point hitch, a hydraulic weight distribution system including hydraulic actuators connected to said lower draft arms of said three point hitch for controlling implement position, at least one drive wheel, a first signal generator connected to said drive wheel for sensing rotation of said drive wheel, at least one freely rotatable wheel, a second signal generator connected to said freely rotatable wheel for sensing rotation of said freely rotatable wheel, and electrical circuit including said signal generators, a signal comparator for comparing signals from said signal generators generating a difference signal, a second signal comparator for comparing said difference signal with the signal from said signal generator connected to said drive wheel for generating a ratio signal proportional to and indicating the percentage of wheel slippage of said drive wheel, a reference signal generator for generating a reference signal indicative of desired percentage of wheel slippage, a signal summer for summing the ratio signal and the reference signal and generating a control signal, an electrically operated control valve in said hydraulic weight distribution system connected to said actuators for distributing the weight of said tractor to and from said drive wheel by controlling said actuators, conductors between said signal summer and electrically operated control valve to transmit said control signal to said electrically operated control valve to thereby control said valve for distribution of the weight of said tractor to and from said drive wheel responsive to deviation of actual percentage of drive wheel slippage from the desired percentage of drive wheel slippage.

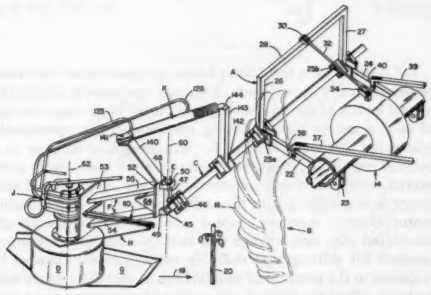
3,913,681
OUTRIGGED ROTATING CULTIVATOR

William D. Lincoln, and William W. Lincoln, both of Napa, Calif., assignors to Lincoln Farm Equipment Company, St. Helena, Calif.

Filed Apr. 17, 1974, Ser. No. 461,580

Int. Cl.² A01B *63/00, 33/00*

U.S. Cl. 172—5 **4 Claims**



1. An outrigged tiller for pivotal mount to a tractor between a distant location from said tractor and an adjacent location to said tractor comprising: a rigid arm mounted to said tractor at one end extending substantially horizontally at approximately right angles to said tractor direction of forward movement at least one half the distance between the side of said tractor and the distant location of said tiller from said tractor; a rotating tiller having depending tilling implements for passing over and through the ground in tilling relation; means coupled to said tiller for rotating said tilling implements; at least one link extending between said tiller and the outboard end of said arm for moving said tiller with said arm in the direction of forward movement of said tractor and permitting upward and downward movement of said tiller with respect to said tractor; a hinge connecting said link to said outboard end of said arm, said hinge having a substantially vertical axis of rotation at substantially right angles to said arm and having pivotal limits of movement to move said tiller between said distant location from said tractor and said adjacent location to said tractor; a second link pivotally mounted to said tiller and

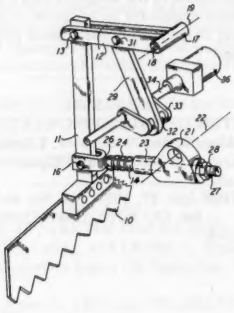
pivotally connected to said hinge for maintaining said tiller in a controllably constant relationship with the ground during upward and downward movement of said tiller; means for moving said rotating tiller about said hinge coupling one of said links to said rigid arm; and, sensing means mounted to said tiller for detecting obstacles in the path of said rotating tiller operably connected to said moving means to swing said tiller on said hinge from said distant location from said tractor to said adjacent location to said tractor.

3,913,682

CONTROLS FOR A SOD CUTTER BLADE

William C. Kaercher, Jr., Minneapolis, Minn.; Donald G. Haffner, Greendale, and Anthony J. Saila, South Milwaukee, both of Wis., assignors to Jacobsen Manufacturing Company, Racine, Wis.

Filed Apr. 1, 1974, Ser. No. 456,849
Int. Cl.[2] A01B *45/04, 33/00*
U.S. Cl. 172—20 **13 Claims**



1. Controls for a sod cutter blade, comprising an electrical power source, a cutter blade, a linkage operatively connected to said cutter blade for moving said cutter blade into and out of sod, a motor and a driving means therefor operatively connected with said linkage for actuating said linkage in a cyclical manner, a shiftable motor control operatively connected with said motor for controlling the operation of said motor in accordance with the shifted position of said shiftable motor control member, motor control means operatively associated with said linkage and said shiftable motor control member for shifting said shiftable motor control member in response to the position of said linkage to thereby control said motor to effect the cyclical movement of said linkage and said cutter blade, energizable means operatively connected to said shiftable motor control member, and measuring control means operatively connected with said energizable means and including a ground-traversing mechanism engageable with the ground and having a member operative in response to the distance engaged on the ground, for operatively connecting said power source with said energizable means in accordance with the ground traversed by the sod cutter.

3,913,683

IMPLEMENT TRANSPORT ATTACHMENT

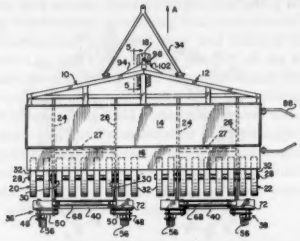
Nils O. Olsson, Ancaster, and Robert W. Logue, Hamilton, both of Canada, assignors to International Harvester Company, Chicago, Ill.

Filed Jan. 11, 1971, Ser. No. 105,191
Int. Cl.[2] A01B *63/22, 73/00*
U.S. Cl. 172—240 **2 Claims**

1. A transport wheel assembly for an agricultural implement having a frame section extending transversely to the forward direction of travel on the implement, the wheel assembly comprising:

a pair of arm members pivotally mounted in spaced apart relation on said frame section for pivotable movement in a common vertical plane disposed in parallel relation to said frame section;

a pair of transport wheels mounted on said pair of arm members respectively for pivoting movement with said arm members between a raised position and a ground-engaging position;



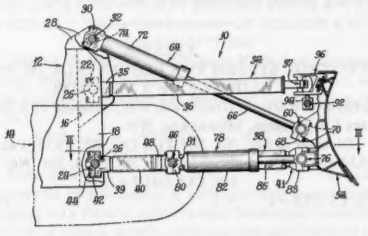
a double acting hydraulic piston-cylinder unit having a cylinder portion pivotally coupled to one of said arm members and a piston portion pivotally coupled to the other of said arm members, whereby said arm members are pivoted in unison in response to extension and retraction of said piston-cylinder unit.

3,913,684

IMPLEMENT MOUNTING ARRANGEMENT HAVING LIFTING AND ANGLING CAPABILITY

Thomas Patrick Casey, Burlington, Iowa; Jerrold Ray Asal, Channahon, and James Alan Olthoff, South Holland, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 13, 1974, Ser. No. 532,560
Int. Cl.[2] E02F *3/76*
U.S. Cl. 172—804 **9 Claims**



1. An implement mounting arrangement having lifting and angling capability, comprising:

a support structure mountable to a vehicle;

a pair of substantially horizontal frame members elevationally spaced from one another, one end of each of said members being mounted to pivot vertically from a side of said structure removed from said vehicle;

an implement communicating generally in the center thereof in a universally pivotal manner to the other end of each of said members;

an element of adjustable length generally coplanar with one of said members horizontally pivotally coupled at one end thereof to said one of said members and universally pivotally coupled at the other end thereof to said implement spaced away from the center thereof to angle said implement by changing the horizontal angle between said implement and said structure; and

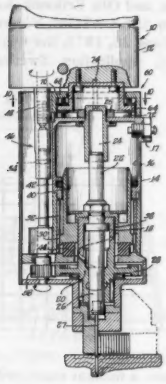
a lifter of adjustable length vertically pivotally mounted at one end thereof to said structure at one elevation and at the other end thereof to said implement at another elevation to move said implement substantially vertically.

3,913,685

FASTENER DRIVING TOOL

Robert Victor Enstrom, Oak Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 6, 1974, Ser. No. 440,223
Int. Cl.² B25D *11/10*
U.S. Cl. 173—117 **12 Claims**



1. In a fastener driving tool, a drive mechanism housing, a ram mounted for nonrotating axial movement in the housing, spring means in the housing adapted to urge the ram forwardly in the housing, a ram actuating means mounted for rotation about the axis of the ram, the ram and ram actuating means including first and second cam means respectively fixedly mounted thereto, the first cam means being disposed rearwardly of the second cam means in housing, each cam means including a rising surface and drop-off surface wherein rotation of the actuating means forces the ram rearwardly in the housing against the spring bias and then allows the ram to be driven forwardly under the spring bias, an electric motor means operatively connected to the housing and including a rotary drive shaft extending therefrom, a drive train connecting the drive shaft to the ram actuating means for providing rotary motion to the ram actuating means and second cam means, coupling means in the drive train for allowing the actuating means to accelerate in rotational movement relative to the drive shaft.

3,913,686

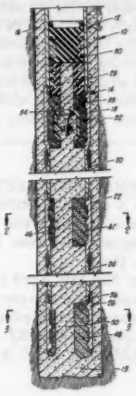
METHOD AND APPARATUS FOR PREVENTING AND DETECTING ROTARY DRILL BIT FAILURE

Charles D. Manson, Jr., Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Mar. 18, 1974, Ser. No. 451,800
Int. Cl.² E21B *13/00*
U.S. Cl. 175—39 **21 Claims**

1. A method, of preventing the failure of a rotary drill bit as a result of roller cutters thereof becoming jammed when drilling through a first material blocking a conduit and remaining jammed during continued drilling through a softer second material blocking said conduit, comprising the step of:

a. drilling through an interrupted annular portion of a core of hardness greater than said second softer material, so that when said interrupted annular portion is drilled the roller cutters of said drill bit impact with lateral portions of said interrupted annular portion so as to forcibly urge



said roller cutters to rotate; and

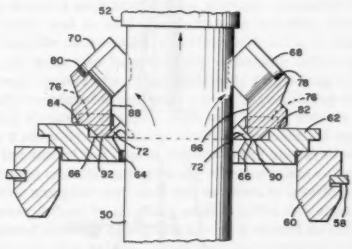
b. concurrently drilling through said softer second material.

3,913,687

PIPE HANDLING SYSTEM

Laszlo Gyongyosi, and Everett A. Whetstone, both of Harris, W. Va., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Mar. 4, 1974, Ser. No. 447,574
Int. Cl.² E21B *19/14*
U.S. Cl. 175—85 **2 Claims**



1. A system for use on a tower for removing from and placing pipe in a well, the pipe having a coupling of larger outside diameter than the outside diameter of the remainder of the pipe comprising: a vertically movable power head mounted on the tower, the power head having means for connecting a pipe coupling to the power head; a pulley system comprising coaxial spaced apart sheaves mounted on and extending below the power head and a cable extending around each sheave with one end anchored to the tower and the free end extending downwardly from the sheave; a pipe transfer elevator attached to the free ends of the cables, the pipe transfer elevator having means for attaching the transfer elevator to the free ends of the cables and an arcuate portion, the space between the extremities of the arcuate portion being such that the arcuate portion may fit over the smaller diameter portion of the pipe but the coupling will be contained in the arcuate portion after the arcuate portion has been fit over the small diameter portion and then pulled over the coupling, the arcuate portion also having a radially extending arcuate shoulder adapted to contact the bottom edge of the coupling; a pair of pivotable pipe string holding members mounted on a plat-

form of the tower each pipe string holding member being a semi-circular shoulder adapted to be contacted by the bottom edge of a pipe coupling for support of the pipe string, each pipe holding member also having an outside portion tapering downwardly and inwardly at an angle of approximately 45° to the horizontal, when the pipe string holding member is positioned to hold a pipe string, each pipe string holding member also being constructed so that when it is pivoted to permit the vertical movement of the pipe string, said tapering portion will lie flat against a flat pipe string holding member support.

3,913,688

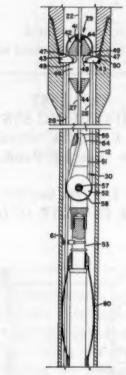
APPARATUS FOR MOUNTING ELECTRIC CONDUCTOR IN A DRILL STRING

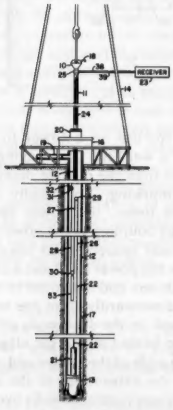
Joe K. Heilhecker; Donald B. Wood, and Karl O. Heintz, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Division of Ser. No. 350,459, April 12, 1973, Pat. No. 3,825,078, which is a continuation-in-part of Ser. No. 267,729, June 29, 1972, abandoned. This application Mar. 11, 1974, Ser. No. 449,787

Int. Cl.[2] E21B *17/00, 47/12*

U.S. Cl. 175—320 **10 Claims**





1. A drilling apparatus having a sectionalized tubular drill string, a rotary drill bit connected thereto, and means for adding additional pipe sections to said drill string, wherein the improvement comprises: an insulated electric conductor disposed within said drill string and having a lower end at a subsurface location, an upper end proximate the upper end of said drill string, an intermediate portion arranged in a convoluted configuration thereby storing substantial amounts of excess conductor in said drill string, and a connector at said upper end, said connector being adapted to be disconnected to permit the addition of pipe sections to the upper end of said drill string; and means for elevating said upper end of said conductor relative to said drill string to cause said excess conductor to be paid out of said convoluted portion thereby permitting said conductor to be extended through additional pipe sections added to said drill string.

3,913,689

CORE FOR NUCLEAR REACTORS

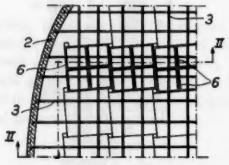
Ingmar Andersson, and Olle Eriksson, both of Vasteras, Sweden, assignors to ASEA-ATOM, Vasteras, Sweden

Filed June 28, 1973, Ser. No. 374,379

Claims priority, application Sweden, Aug. 11, 1972, 10422/72

Int. Cl. G21c *9/00*

U.S. Cl. 176—87 **5 Claims**



1. In combination, a nuclear reactors core and a moderator tank, a plurality of polygonal fuel assemblies surrounded by said tank, said tank having a lid, and means fixing the fuel assemblies comprising an assembly grid shaped as a lattice, each fuel assembly comprising a polygonal shroud, a plurality of fuel rods and a plurality of control rod guide tubes surrounded by the shroud, the walls of the shroud, at least in a majority of the fuel assemblies, having such an axial extension that their upper edges extend above said control rod guide tubes, means securing said assembly grid in the lid of the moderator tank and said grid securing said assemblies against lateral movement by having a mechanical contact with said upper edges in a major part of the total number of assembly shrouds, the vertical planes along the surfaces of the assembly grid crossing the vertical planes along the surfaces of the assembly shrouds.

3,913,690

CRANE LOAD INDICATING ARRANGEMENT

Bernard David Francis Hutchings, Chelmsford, and Robert William Hubbard, Southend-on-Sea, both of England, assignors to Pye Limited, Cambridge, England

Filed May 9, 1974, Ser. No. 468,249

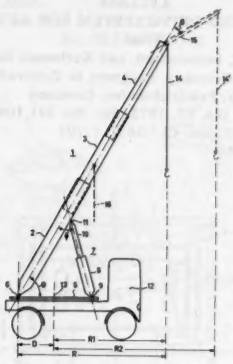
Claims priority, application United Kingdom, May 16, 1973, 23233/73

Int. Cl.[2] G01G *19/04, 23/18, 19/14*

U.S. Cl. 177—25 **18 Claims**

1. A load indicating arrangement for a crane having a pivoted boom comprising, means for producing a first output signal representative of the total turning moment of the boom about its pivot in supporting a load, means for producing a second output signal representative of the horizontal distance between the boom pivot point and the load, means for producing a third output signal which is the quotient obtained by dividing said first output signal by said second output signal, said third output signal being thus representative of total effective load, a law generator unit for each mode of operation of the crane, each unit being adapted to produce a fourth output signal representative of the maximum safe load for the

crane in the instant mode of operation, and means for comparing said fourth output signal with said third output signal to



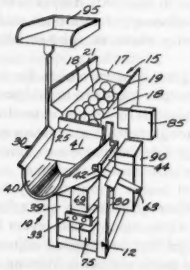
provide an indication of the actual crane load relative to the maximum safe load.

3,913,691

FRUIT DELIVERY, WEIGHING, AND BAGGING APPARATUS

Harry C. Powell, Jr., Faber, Va., assignor to Powell Machinery, Inc., Faber, Va.

Filed July 1, 1974, Ser. No. 484,926
Int. Cl.² G01G *1/18, 21/24*
U.S. Cl. 177—202 **8 Claims**



1. An assembly for weighing and bagging fruit or like product, said assembly comprising

a. scoop means for receiving fruit and facilitating weighing and bagging of said fruit,

b. a scale for weighing the accumulated fruit received by said scoop means, said scale including (i) a moveable member operatively connected to said scoop means, (ii) a stationary member rigidly connected to a frame for said assembly, (iii) two spaced link means, each of said link means pivotally connected at spaced pivot points thereof to said moveable member and said stationary member, (iv) ball-bearings located at the pivot points between each of said link means and said stationary member and said moveable member respectively, and (v) a balance weight operatively connected to one of said link means, and

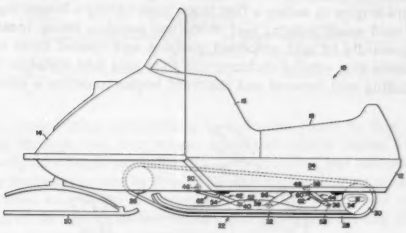
c. means for delivering fruit to said scoop means.

3,913,692

SNOWMOBILE SUSPENSION SPRING ADJUSTMENT

Thomas Herbert Lohr, and Stephen Clair Scholten, both of Horicon, Wis., assignors to Deere & Company, Moline, Ill.

Filed Apr. 20, 1973, Ser. No. 352,934
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B62M *27/02*
U.S. Cl. 180—5 R **6 Claims**



1. In a snowmobile of the type including a main longitudinal frame including laterally spaced generally vertical sidewalls partially defining a longitudinal cavity in the underside of the frame, a drive sprocket means mounted at a forward location in the cavity for rotation about a transverse horizontal axis, an endless track trained about the drive sprocket means and having upper and lower runs respectively located in and below said cavity, track-engaging member means located between said upper and lower runs and downwardly biased suspension means linking said track-engaging member means to said main frame for vertical movement relative thereto and for biased engagement with said lower run of the track, the improvement comprising: said suspension means including at least one link having opposite ends respectively pivotally connected to said main frame and to said track-engaging member means for permitting the latter to travel vertically relative to the main frame; at least one longitudinally extending adjusting arm positioned against one of said sidewalls and having one end pivotally connected to said main frame for permitting said arm to swing vertically coaxially with said link; a torsion spring having a plurality of helically wound coils mounted coaxially about the axis of the pivotal connection of said arm with the main frame; said coil spring having a first terminal end portion extending alongside said arm and received in a spring-retaining groove defined by a surface portion of the arm adjacent an end thereof and said coil spring having a second terminal end portion extending alongside said link and engaging a surface portion of the link intermediate the ends thereof; said one of said sidewalls having a bottom edge defined by a generally horizontal flange; adjustable connecting means connected to said flange and including an adjusting bolt projecting upwardly through said arm adjacent said end thereof and having a wrench-engageable head located below the level of the flange whereby the force exerted by said torsion spring may be increased and decreased respectively in response to the adjusting arm being adjusted to positions angularly closer to and further from the link through means of the adjusting bolt.

3,913,693

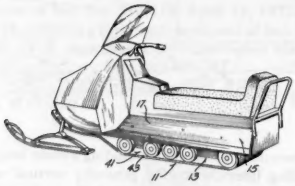
SNOWMOBILE DRIVE SUSPENSION SYSTEM

Gordon B. Hale, Waukegan, and Richard A. Wlezien, Antioch, both of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 126,416, March 22, 1971, abandoned. This application May 18, 1973, Ser. No. 361,468
Int. Cl.² B62M *27/00*
U.S. Cl. 180—5 R **13 Claims**

1. A snowmobile comprising a chassis, a drive sprocket rotatably mounted on said chassis, a movable track supporting

carriage including forward and rearward track supporting bogies mounted on said carriage for rotation about axes fixed relative to said carriage adjacent the forward and rearward ends of said carriage and with said track trained thereabout, a track having a fixed length and trained around said drive sprocket and said forward and rearward bogies, and means for mounting said carriage to said chassis for movement between an extended position, a retracted position, and an intermediate position, said extended position being spaced from said chassis at a first distance and locating said forward and rearward bogies to define a first track path having a length equal to said track length, said retracted position being located rearwardly of said extended position and spaced from said chassis at a second distance less than said first distance and locating said forward and rearward bogies to define a second



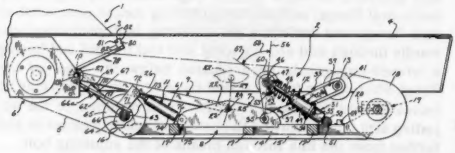
track path having a length equal to said track length, said intermediate position being intermediate said extended and retracted positions and locating said forward and rearward bogies to define a third track path having a length equal to said track length, said carriage mounting means including forwardly and rearwardly spaced rigid links pivotally connected to said carriage about axes fixed relative to said carriage and extending in parallel relation to each other upwardly and forwardly from said carriage, each of said links also being pivotally connected to said chassis and said rearward link being dimensioned such that the distance between the pivotal connections of said rearward link to said chassis and to said carriage is substantially constant and substantially equal to the distance between the pivotal connections of said forward link to said carriage and to said chassis.

3,913,694

SUSPENSION APPARATUS FOR GROUND ENGAGING DRIVE TRACKS

Lyle M. Forsgren, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Apr. 1, 1974, Ser. No. 456,478
Int. Cl. B62d *53/10*
U.S. Cl. 180—5 R **20 Claims**



1. A suspension apparatus for supporting a flexible and endless drive track within a vehicle chassis comprising:

a support means mounted to engage the lower run of the endless drive track,

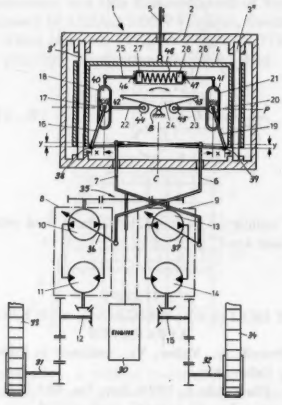
a resilient support assembly including a support axle having means for securement to the chassis, a crank means pivotally secured to the support means and having a first crank arm pivotally coupled to the axle with a lost motion coupling and having a second angularly related crank arm, said first and second crank arms being operatively connected for interrelated, corresponding, angular movement, and a shock absorbing means secured to the outer portion of said second crank arm and to the support means.

3,913,695

FLUID-ACTUATED DRIVE SYSTEM FOR AUTOMOTIVE VEHICLE

Willy Holdenried, Immenstaad, and Karlmann Hamma, Tettnang, both of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Germany

Filed Jan. 15, 1975, Ser. No. 541,106
Int. Cl.² B62D *11/04*
U.S. Cl. 180—6.48 **8 Claims**



1. A system for maneuvering an automotive vehicle equipped with two traction elements on opposite sides thereof, comprising:

a pair of reversible fluidic transmissions drivingly coupled with said traction elements, respectively;

a source of power coupled with both said fluidic transmission for driving same at substantially identical input speeds;

first and second adjustment means for separately varying the ratios of output speeds to input speeds of each of said fluidic transmissions in a range extending from a positive maximum through zero to a negative maximum;

a slider displaceable between two limiting positions on opposite sides of a neutral position;

first and second levers symmetrically fulcrumed on said slider at locations flanking a centerline parallel to the direction of displacement, said levers being respectively linked with said first and second adjustment means;

first and second guide elements forming a pair of elongate tracks, said guide elements being rotatable about fixed parallel axes symmetrically flanking said centerline and lying in a median plane perpendicular thereto;

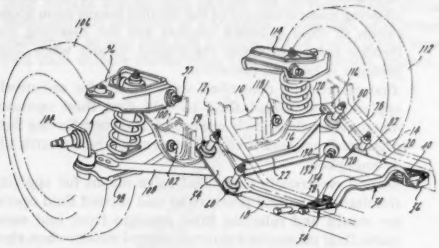
biasing means urging each of said guide elements into a normal position in which the track thereof parallels said centerline, said first and second levers being provided with free ends engaging the tracks of said first and second guide elements, respectively, at intermediate points in said normal position thereof with said slider in said central position; and

a common control member for selectively rotating either of said guide elements from said normal position into an off-normal position in which the track thereof includes an acute angle with said centerline whereby the point of engagement of the associated lever is moved toward either end of the track upon a shifting of said slider in a respective direction from said neutral position to establish a speed ratio of corresponding sign in the associated fluidic transmission.

3,913,696
CHASSIS CONSTRUCTION FOR A MOTOR VEHICLE

James H. Kennedy, Sterling Heights, and Robert D. Negstad, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 8, 1974, Ser. No. 467,983
Int. Cl.² B60K 5/02
U.S. Cl. 180—11 3 Claims



1. A motor vehicle chassis comprising vehicle frame structure constructed to support a vehicle body,

said frame structure including left and right longitudinally extending side rails,

a subframe assembly having left and right longitudinally extending side members and fore and aft transversely extending members,

said subframe assembly having a generally box shape in plan view,

said longitudinally extending side members having forward end portions that extend upwardly and forwardly,

left and right forward resilient mounting means connecting said forward end portions of said side members to said side rails,

said forward resilient mounting means each comprising a resilient mount having an axis inclined upwardly and rearwardly in the side elevational view,

a pair of aft resilient mounting means connecting said subassembly to said side rails,

left and right suspension arms pivotally connected to said frame structure and constructed to be connected to left and right wheel support members,

left and right suspension struts having their outer ends connected to said left and right suspension arms, respectively,

resilient pivot means connecting the inner ends of said left and right struts to said forward end portions of said left and right side members of said subframe assembly, respectively,

power plant mounting means supported on said subframe assembly,

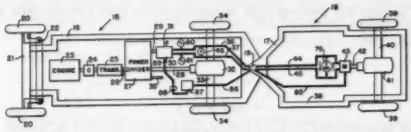
said power plant mounting means being constructed to be connected to a vehicle power plant and to retard the transmission of vibrations from said power plant to said subframe assembly.

3,913,697
VEHICLE HAVING A POWER TAKE-OFF AND A HYDRAULIC MOTOR, AND METHOD OF DRIVING SAME

Clarence Kirk Greene, Arlington Apartments, Apt. 12 J, 100 N. Arlington Ave., Reno, Nev. 89501

Continuation-in-part of Ser. No. 342,219, March 16, 1973. This application June 3, 1974, Ser. No. 475,655
Int. Cl.² B62D 59/04
U.S. Cl. 180—14 A 22 Claims

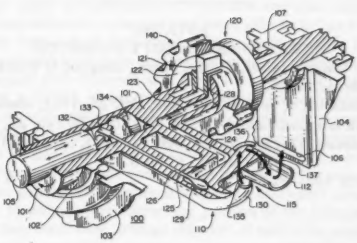
1. A method of driving a self-propelled vehicle means having primary and secondary ground-engaging driving elements situated on different transverse axes from a power plant on the vehicle means, which comprises applying power from the power plant to the primary driving element, driving a variable-displacement pump from said power plant through a power take-off unit, adjusting the displacement of said pump to balance approximately the pressures in duct means including supply and return ducts interconnecting said pump and a hydraulic motor which is coupled to drive the secondary driving element, said adjustment being valid when the vehicle means moves forwardly on straight road affording good traction, transmitting substantially no hydraulic power by flow of fluid through said duct means when the vehicle moves forwardly on straight road affording good traction, and transmitting hydraulic power by flow of fluid through said duct means between said pump and motor substantially only when the ratio of the speeds of the primary and secondary driving elements is altered.



3,913,698
VARIABLE SPEED TRANSMISSION

Laird B. Gogins, Salt Lake City, Utah, assignor to Power-Matic Corporation, Salt Lake City, Utah

Filed Feb. 1, 1974, Ser. No. 438,585
Int. Cl.² B60K 17/10
U.S. Cl. 180—66 R 10 Claims



1. A variable speed transmission comprising an input shaft, an hydraulic pump having an action section operatively coupled with said input shaft and a reaction section, a nozzle arranged for rotation with said input shaft and the action pump section, conduits directing fluid to said nozzle from said action pump section, a runner vane spaced from said nozzle and mounted for rotation therewith, and a group of reversing blades positioned between said nozzle and said runner vane to redirect a fluid stream from said nozzle against said runner vane whereby the fluid torques upon said nozzle and said runner vane are cumulative with the mechanical torque exerted upon said input shaft.

3,913,699
AUTOMOTIVE POWER SYSTEM

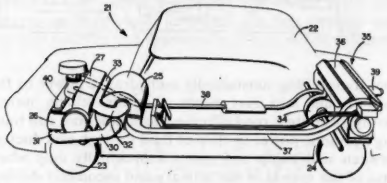
Glenn L. Dyer, Four Fox Run Road, Bedford, Mass. 01730

Filed Nov. 18, 1974, Ser. No. 524,955
Int. Cl.² B60K 3/02
U.S. Cl. 180—66 C 36 Claims

1. An automotive power system for use in a vehicle having a frame, front and rear axles, and wheels rotatably mounted to said axles for rolling upon a surface, said power system comprising:

a combustion chamber mounted to said frame;

means for supplying fuel to said combustion chamber;
a compressor motor mounted to said frame and having an intake and an exhaust;
a first conduit coupling the interior of said combustion chamber with the intake of said compressor motor;
a compressor mounted to said frame and having an intake and an exhaust;
a second conduit coupling the interior of said combustion chamber with the exhaust of said compressor;
means for driving said compressor by said compressor motor;



a drive motor separate from said compressor and said compressor motor mounted to said vehicle and having an intake and an exhaust, said drive motor being coupled to one of said axles for rotation thereof to drive the wheels mounted to said one axle, said drive motor being rotatable in either direction;
a third conduit coupling the interior of said combustion chamber with the intake of said drive motor; and
means for controlling the speed and direction of rotation of said drive motor.

3,913,700

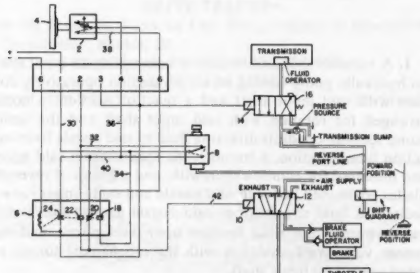
TRANSMISSION SHIFT INHIBITOR

Larry Rodger James, Olathe, Kans., assignor to Paccar Inc., Bellevue, Wash.

Continuation of Ser. No. 409,707, Oct. 25, 1973, abandoned, which is a continuation of Ser. No. 229,519, Feb. 25, 1972, abandoned. This application Oct. 22, 1974, Ser. No. 516,913

Int. Cl.[2] F16D *67/00*

U.S. Cl. 180—82 R **6 Claims**



1. An automatic reverse control system for a vehicle having a torque producing variable speed engine, manually controlled throttle means for controlling engine speed, traction means for moving the vehicle in forward and reverse directions, manually controlled brake means for selectively stopping movement of the vehicle and shiftable transmission means for selectively transmitting engine torque from the engine to the traction means in one of two directions to cause forward and reverse movement of the vehicle, wherein the automatic reverse control system comprises

a. a first fluid operator means for shifting the shiftable transmission means into a forward torque transmitting condition when fluid pressure is applied thereto and for shifting the shiftable transmission means into a reverse torque transmitting condition upon relief of fluid pressure therefrom;
b. a second fluid operator means for automatically applying the brake means when fluid pressure is applied thereto;
c. automatic fluid pressurized throttle control means for allowing manual control of the throttle means upon application of fluid pressure thereto and for disabling the throttle means to cause the engine to idle when fluid pressure is relieved therefrom;
d. first electrically controlled valve means for selectively applying pressurized fluid to said first fluid operator means when electrically energized, and for relieving fluid pressure from said first fluid operator when electrically de-energized;
e. second electrically controlled valve means for applying simultaneously fluid pressure to said second fluid operator means and relieving fluid pressure from said automatic fluid pressurized throttle control means when electrically energized and for applying simultaneously fluid pressure to said automatic fluid pressurized throttle control means and relieving fluid pressure from said second fluid operator means when electrically de-energized; and
f. automatic vehicle reversing control means for automatically reversing the vehicle by shifting the shiftable transmission means only after the vehicle has substantially stopped, said automatic vehicle reversing control means including
1. a direction control switch operable between a first state which indicates that a forward vehicle direction is desired and a second state which indicates that a reverse vehicle direction is desired.
2. a speed indication switch operable between a first state which indicates that the vehicle has substantially stopped and a second state which indicates that the vehicle is moving, and
3. circuit means connected with said first and second electrically controlled valve means for controlling the energization of said second electrically controlled valve means whenever said direction control switch is in a state indicative of a desired direction different from the actual direction of movement of the vehicle and for inhibiting a change in the state of energization of said first electrically controlled valve means until said speed indication switch is in said first state whereby the direction of the vehicle may be reversed automatically by changing the state of said direction control switch and said first electrically controlled valve is operative to shift the transmission means only when the vehicle is substantially stopped.

3,913,701

VEHICLE INSTRUMENT PANEL COVER ASSEMBLY

Lary Lynn Williams, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 10, 1973, Ser. No. 387,331

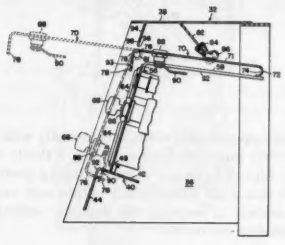
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B60K *37/00*

U.S. Cl. 180—90 **17 Claims**

1. In a vehicle of a type including a seat, an instrument panel support structure spaced forwardly of the seat and a generally upright instrument panel including upper, lower and opposite side edges and being spaced forwardly of the seat and supporting a plurality of instruments positioned so as to be in the line of sight of a forwardly facing operator seated in the seat, an instrument panel cover assembly, comprising: cover support means forming part of said panel support structure and having upwardly facing, substantially planar slide surface means extending forwardly from and generally perpendicular to said

instrument panel adjacent one of said upper and lower edges thereof; an instrument panel cover having a central planar portion dimensioned for covering said instrument panel; said panel cover including first and second end portions at opposite sides of said central planar portion; said panel cover having a stored position wherein said first end portion rests upon said slide surface means at a forward location of the latter and said central panel portion extends generally parallel to said slide surface means; stop surface means being fixed to said panel support structure at a location, in the path of rearward movement of said first end portion of said panel cover along said slide surface means from said stored position, spaced a



distance rearwardly from said forward location of said slide surface means at least as great as that between said forward location and the rear end of said slide surface means; said first end portion and said stop means being configured so as to cooperate to establish a horizontal pivot axis when the cover is in an intermediate position wherein said first end portion is in bearing engagement with said stop means, said cover being pivotable about said axis to an operative position wherein said central planar portion thereof extends rearwardly of and in covering relationship to said instrument panel; and releasable lock means for selectively releasably securing said panel cover to said support structure when the cover is in said operative position.

3,913,702

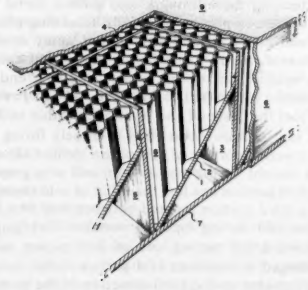
CELLULAR SOUND ABSORPTIVE STRUCTURE

Leslie S. Wirt, Newhall, and Duane L. Morrow, Saugus, both of Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Continuation-in-part of Ser. No. 366,794, June 4, 1973, abandoned. This application Apr. 8, 1974, Ser. No. 458,676

Int. Cl. B64d *33/06*

U.S. Cl. 181—33 G **12 Claims**



1. A sound absorbing panel comprising:

first and second spaced-apart waveguide arrays each comprising a plurality of side-by-side acoustical waveguides of non-uniform length and having adjacent open ends defining the sound-receiving end of the array, the sound receiving end of like waveguides in each of said arrays being spaced from each other by a distance not more than approximately the wavelength of the highest frequency to be absorbed divided by the square root of pi; and

a plurality of waveguide terminating means each of which is disposed with respect to a corresponding one of said waveguides at the end thereof opposite said open end so as to result in that one waveguide having a resonant frequency that is different from the resonant frequencies of those waveguides having different lengths, comprising said array.

3,913,703

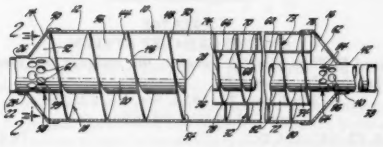
SINGLE INNER ASSEMBLY WAVE INTERFERENCE SILENCER

William J. Parker, Flint, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed May 3, 1974, Ser. No. 466,618

Int. Cl. F01n *1/00*

U.S. Cl. 181—44 **5 Claims**



1. An improved silencer assembly comprising: an outer tube, an inner tube having opposite open ends thereon defining an inner acoustical path, a closure member connected between said outer tube and said inner tube to define a chamber at one end of said outer tube, a helical baffle formed between said inner tube and said outer tube defining an outer acoustical path between said inner tube and said outer tube having a length in excess of the length of said inner tube between said opposite open ends thereof, said outer acoustical path including an inlet at said chamber and an outlet at the outlet of said inner tube, said inner tube including a plurality of holes therein at one open end thereof located at said chamber for exhaust flow between said inner and outer acoustical paths to direct a predetermined portion of the exhaust flow from said inner tube through the inlet of said outer acoustical path and to provide a transparent area at a sound interaction point between the inner acoustical path through the inner tube and the outer acoustical path through the helical baffle to produce sound attenuation by wave interference with reduced turbulence produced noise at the sound interaction point between the inner and outer acoustical paths, said inner tube being imperforate between said plurality of holes and the opposite open end thereof to reduce exhaust flow pressure loss between the opposite open ends of said inner tube.

3,913,704

AIR CUSHION VEHICLE CELL HAVING RIGID BASE

Wilfred James Eggington, Claremont, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Apr. 30, 1973, Ser. No. 355,510

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[3] B60V *1/04*

U.S. Cl. 180—121 **5 Claims**

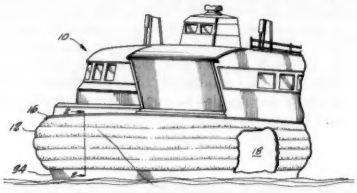
1. An air cushion vessel having a periphery about a hull and supported upon a large central air cushion during transport, comprising:

a. at least one air cushion cell disposed depending from at least a bow section of said periphery forming a bow seal for said larger, central air cushion;

b. each said cell including a flexible wall and capable of vertical compression, and fixed at its upper end to said

periphery of said vessel, said cell being pneumatically connected to a source of air pressure;

c. each said cell further including a rigid base oriented at a planing angle relative to the desired direction of move-



ment of the vehicle, said rigid base having an orifice therein for allowing air to escape to below said base; and

d. at least a portion of said rigid base disposed in substantial contact with a surface over which said vessel transports.

3,913,705

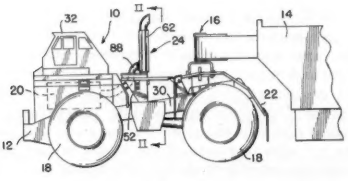
ENGINE EXHAUST SYSTEM

Alfred William Sieving, Decatur, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 21, 1974, Ser. No. 525,797

Int. Cl.² F01N *3/06*; B60K *1/00*

U.S. Cl. 181—36 D **10 Claims**



1. In an exhaust system for an engine of a tractor-trailer vehicle having a turn-stop assembly mounted on the frame of said vehicle rearward of the cab of said vehicle, said turn-stop assembly having a closed chamber, an inlet opening into said chamber, means for conveying exhaust gases from said engine into said chamber through said inlet opening, baffle means in said chamber on opposite sides of said inlet opening, an exhaust stack communicating with the inside of said chamber, and means for blocking the shortest path of said exhaust gases from said inlet to said exhaust stack, whereby exhaust gases from said engine enter said closed chamber and is muffled and dispersed by said baffle means before being discharged from said exhaust stack.

3,913,706

PRESSURE LUBRICATION TO APEX CORNER SEAL

Robert P. Ernest, Dearborn Heights, and Daniel C. Ahrns, Westland, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 6, 1974, Ser. No. 495,691

Int. Cl.² F01M *1/04*

U.S. Cl. 184—6.5 **5 Claims**

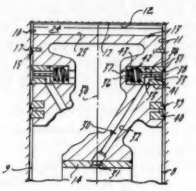
1. For use in a rotary internal combustion engine, the combination comprising:

a. a housing provided with a peripheral wall and opposed side walls,

b. a rotor carried within said housing for planetary movement and having an interior gallery and an axis of movement,

c. sealing elements carried by said engine for providing a dynamic gas-tight seal between said rotor and said peripheral wall and side walls, said elements cooperating to complete a plurality of variable volume chambers between said rotor and housing, and

d. lubrication means carried symmetrically by said rotor with respect to a radial plane bisecting said rotor, said means directing a supply of oil toward and eccentrically



onto said opposed side walls substantially with said variable volume chamber for promoting a thinly controlled smeared film of lubricant across at least a portion of said opposed side walls substantially within said variable volume chambers to improve the dynamic sealing function of said sealing elements.

3,913,707

SHOCK ABSORBING DEVICE

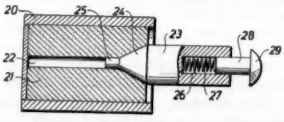
Erik Goran Wastenson, Viken, and Gote Allan Carlsson, Hoganas, both of Sweden, assignors to Hoganas Aktiebolag, Hoganas, Sweden

Filed Aug. 16, 1974, Ser. No. 498,024

Claims priority, application Sweden, Aug. 22, 1973, 7311391

Int. Cl.² F16F *7/12*

U.S. Cl. 188—1 C **2 Claims**



1. A shock absorbing device for a vehicle comprising a housing, means for fastening said housing to a first part of the vehicle, an energy absorbing member positioned in said housing and comprising a porous metal body having a central opening extending therethrough, said porous metal body is capable of being compacted, an axially extending piston having a first end and a second end spaced apart in the axial direction thereof, means for fastening the second end of said piston to a second part of the vehicle, the first end of said piston positioned within said housing and having a first portion extending from the first end and positioned within said central opening of said porous metal body in closely fitting contact therewith, a second portion of said piston located closer to the second end thereof having a cross-sectional area greater than that of the first portion but less than that of said porous metal body, and a third portion located between said first and second portions and having tapering surfaces diverging in the direction toward the second end of said piston, said third portion arranged to compact said porous metal body in the direction transverse to the axial direction of the piston when the piston is forced to penetrate into the porous metal body as said first and second parts of the vehicle move toward one another during a collision, said porous metal body positioned within said housing having one end thereof remote from the piston abutting an end of said housing so as to prevent the axial movement of said porous metal body.

3,913,708
DISC BRAKE ASSEMBLIES FOR VEHICLES

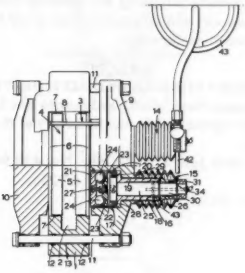
Charles Newstead, Walsall, and Andrew Charles Walden Wright, Lapworth, both of England, assignors to Girling Limited, Birmingham, England

Filed Dec. 21, 1973, Ser. No. 427,107

Claims priority, application United Kingdom, Dec. 22, 1972, 59441/72

Int. Cl.² F16D *55/224, 65/46*

U.S. Cl. 188—71.9 **5 Claims**



5. A disc brake assembly for vehicles comprising a stationary member, an axially fixed rotatable disc, first and second friction pad assemblies for engagement with opposite faces of said disc guided in said stationary member, a clamp assembly straddling the peripheral edge of said disc and movable axially with respect to said stationary member, said clamp assembly having a first limb acting on said first friction pad assembly and a second limb, applying means for applying said second friction pad assembly directly to said disc comprising a housing screw-threadedly engaged in said second limb and acting between said second limb and said first pad assembly, a first part of said applying means located in said housing, means keying said first part against rotation relative to said housing, and a second part of said applying means rotatable in said housing relative to said first part to increase the effective length of said applying means, and adjuster means for rotating the entire housing relative to said second limb when rotation of said second part exceeds a predetermined value as said parts are returned to inoperative retracted positions at the termination of a braking application whereby the overall axial length of said brake is reduced upon wear of said friction pad assemblies.

3,913,709
SPOT-TYPE DISC BRAKE

Jochen Burgdorf, Offenbach; Karl-Heinz Klose, Frankfurt, and Karl Storzel, Sprendlingen, all of Germany, assignors to ITT Industries, Inc., New York, N.Y.

Filed June 17, 1974, Ser. No. 479,934

Claims priority, application Germany, Aug. 9, 1973, 2340316

Int. Cl.² F16D *55/224*

U.S. Cl. 188—73.4 **5 Claims**

1. A spot-type disc brake comprising:

a brake disc;

a brake actuating means;

a pair of brake shoes each having a backing plate and a brake pad, one of said brake shoes being disposed on one side of said disc actuated by said actuating means and the other of said brake shoes being disposed on the other side of said disc;

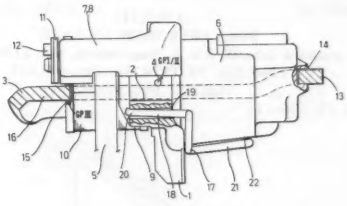
a non-rotating brake carrier carrying said brake shoes and receiving braking torque, said carrier being immovable relative to said disc;

a frame embracing said disc and movably guided with respect to said carrier in a direction toward and away from said disc, said frame transmitting the actuating force of said actuating means to said other of said brake shoes;

said brake actuating means including a housing rigidly connected to said frame and having a force receiving contact surface below said frame which is inclined upward toward said frame in a direction away from said disc;

at least three guide points to rigidly support and movably guide said frame, at least two of said guide points being rigidly connected to said carrier; and

a biased spring having two arms each engaging a different one of two circular holes formed in and extending



through said carrier parallel to, spaced from and below said frame and a loop interconnecting said two arms under tension resting against said contact surface to apply a horizontal and vertical component of force to a point on said contact surface to hold said frame without clearance against said guide points, said point on said contact surface being spaced from said guide points;

each of said arms including deflection on the ends thereof fastened in an associated one of said holes of said carrier and fastened in said backing plate of said one of said brake shoes.

3,913,710
SHOE DRUM BRAKES

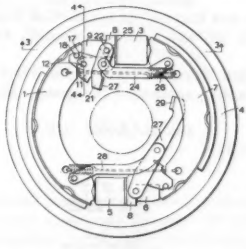
Hugh Grenville Margetts, Leamington Spa, England, assignor to Girling Limited, Birmingham, England

Filed July 3, 1974, Ser. No. 485,610

Claims priority, application United Kingdom, July 5, 1973, 32125/73

Int. Cl.² F16D *65/58*

U.S. Cl. 188—79.5 GE **5 Claims**



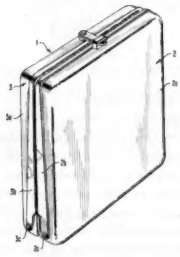
1. A shoe drum brake incorporating an adjuster for automatically adjusting the off position of a shoe, wherein the shoe is actuated by a piston working in a hydraulic cylinder mounted on the back-plate of the brake, an adjusting lever interposed between the shoe and a housing member associated with the cylinder said housing member having an extension, means pivotally mounting said lever intermediate its ends on said extension and having limited movement in said extension towards the shoe, means connecting the outer end of said lever with said shoe for movement therewith, said lever terminating at its inner end in an arcuate toothed face cooperating

with a complementary toothed surface on the housing member, said connecting means of said lever with said shoe being arranged relative to the means pivotally mounting said lever with said housing extension that upon outward movement of said shoe beyond a predetermined value greater than said limited movement permitted by said pivotal mounting means in the application of the brake said connecting means in cooperation with said mounting means effects separation of the respective toothed surfaces while simultaneously moving said lever angularly about said pivotal mounting means whereby on release of the brake the lever and shoe return to new adjusted positions.

3,913,711
PORTABLE DISPLAY CASE

J. Leonhard Schmid, Rte. 5, Hagerstown, Md. 21740

Filed Apr. 10, 1974, Ser. No. 459,612
Int. Cl.² B65D *5/042*
U.S. Cl. 190—16 **6 Claims**

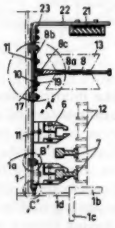


1. A portable display case comprising a pair of containers having substantially flat face portions, each container including a body portion having a display area and a cover portion hingedly connected to the said body portion having bottom, side and end walls and a front wall portion formed integrally with the side walls and one end wall of said body portion, said front wall portion being parallel to and spaced from the bottom wall of the body portion, and releasable connector means interposed said front wall portions for connecting the containers in abutting face-to-face relationship.

3,913,712
RAIL STRUCTURE

Klaus Becker, and Hartwig Sprung, both of Wetter, Germany, assignors to DEMAG Aktiengesellschaft, Duisburg, Germany

Filed May 31, 1974, Ser. No. 475,140
Claims priority, application Germany, June 20, 1973, 2331476
Int. Cl.² B60M *1/30*
U.S. Cl. 191—32 **15 Claims**



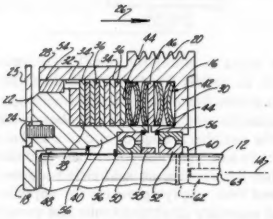
1. A support system for continuous contact electric rails of a rail system, comprising

a. a support for said rail system;
b. a rail support plate disposed substantially parallel to but spaced apart from said rail system support;
c. a plurality of mounting bore holes in said rail support plate;
d. a plurality of resilient vibration absorbers extending between said rail system support and said rail support plate accommodating relative orientation therebetween;
e. a plurality of bolts passing through said vibration absorbers, said mounting bore holes, and said rail system support; and
f. said resilient vibration absorbers surrounding said bolts for individually adjusting the spacing between said rail system support and said rail support plate for said relative orientation therebetween.

3,913,713
TEMPERATURE RESPONSIVE DRIVE UNIT

Erwin F'Geppert, Novi, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 4, 1974, Ser. No. 430,961
Int. Cl.² F16D *43/25*
U.S. Cl. 192—70.25 **6 Claims**



1. A temperature responsive drive unit comprising a stationary support shaft; an annular drive hub comprising an outer peripheral side wall concentric with the shaft, and an end wall radiating inwardly from said side wall toward the shaft; a driven hub comprising an inner peripheral side wall encircling the stationary shaft within the space circumscribed by the aforementioned outer peripheral side wall, and a second end wall radiating outwardly from the inner peripheral side wall; thermally-energized clutch means acting axially between the end walls of the drive and driven hubs to transmit a variable drive force from the drive hub to the driven hub; first bearing means between the stationary shaft and the inner peripheral side wall of the driven hub; second bearing means between the shaft and the end wall of the drive hub; and third bearing means between the end wall of the driven hub and the outer peripheral side wall of the drive hub.

3,913,714
CLUTCH RELEASE MECHANISM

John Walter Aldridge Camp, Colchester, England, assignor to Ford Motor Company, Dearborn, Mich.

Claims priority, application United Kingdom, June 28, 1972, 30226/72
Filed June 28, 1973, Ser. No. 374,743
Int. Cl.² F16D *19/00, 13/60, 23/00*
U.S. Cl. 192—995 **8 Claims**

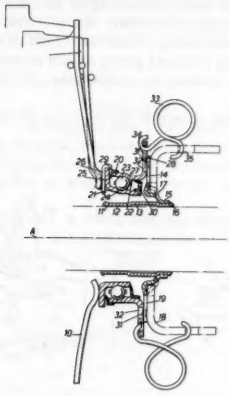
1. A clutch release mechanism comprising a clutch release bearing carrier having a support portion constructed to engage a support member and to be axially displaceable relative thereto,

a clutch release bearing constructed to engage a release member of a clutch assembly,

said carrier having a radially extending flange,

said clutch release bearing having a radially extending flange slidably engaging one side of said flange of said carrier,

said clutch release bearing being radially displaceable relative to said carrier to accommodate misalignment between the axis of said support member and the axis of rotation of said release member,



a clutch release lever having spaced portions engaging the other side of said flange of said carrier,

spring means engaging said flange of said bearing constructed to urge said flange of said bearing into engagement with said flange of said carrier.

3,913,715

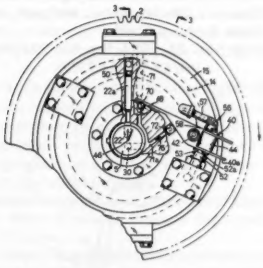
MODULATABLE FRICTION CLUTCH CONTROLLED BY A CENTRIFUGAL FORCE AND ANGULAR ACCELERATION SENSITIVE VALVE

Frank W. Groves, Rockford, Ill., assignor to Twin Disc, Incorporated, Racine, Wis.

Filed Aug. 22, 1974, Ser. No. 499,501

Int. Cl.² F16D *43/284*

U.S. Cl. 192—103 FA **15 Claims**



1. A modulatable, hyraulically actuated friction plate type clutch having an input member, an output member, interleaved friction clutch plates between said members, and hydraulically actuated means for slippingly clamping up said clutch plates, clutch apply pressure means for conducting clutch apply fluid pressure to said hydraulically actuated means thereby causing slipping engagement of said interleaved clutch plates, hydraulic control means comprising, an element pivotally mounted on one of said members, said clutch apply pressure means being in communication with said element and forming a valve therewith whereby said element can pivot and either close said apply pressure means and permit clutch clamp up or open said apply pressure means in varying degrees and dump said apply fluid pressure in vary amounts, and remotely controlled pressure means including a pair of spaced apart fluid operated pressure producing means acting on said pivoted valve element to tend to pivot said element to close said apply pressure means.

3,913,716

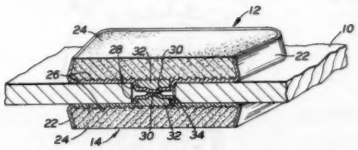
WELDED FRICTION ARTICLE AND METHOD OF ASSEMBLY

Daniel T. Sedlock, Bedford, Ohio, assignor to Abex Corporation, New York, N.Y.

Filed Apr. 4, 1974, Ser. No. 457,950

Int. Cl.² F16D *13/60*

U.S. Cl. 192—107 R **10 Claims**



1. A friction article comprising a carrier plate having a mounting aperture formed therein, a pair of friction devices having outer friction faces and inner mounting faces contacting opposite sides of the carrier plate and clamping the carrier plate therebetween, and means connecting the friction devices together through the aperture including a projection smaller than the aperture extending into the aperture from both inner faces into mutual contact, said projections being resistance projection welded together to provide the sole means mounting both friction devices into clamping relation with the carrier plate.

3,913,717

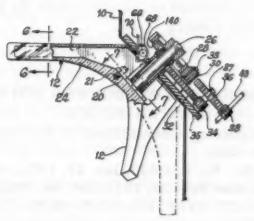
TURNSTILE APPARATUS

Terence John Collins, Schaumburg, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Sept. 26, 1973, Ser. No. 400,937

Int. Cl.² G07F *9/02*

U.S. Cl. 194—16 **16 Claims**



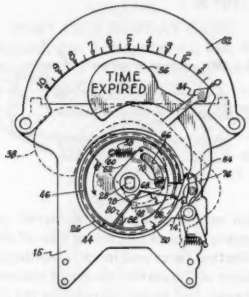
12. In a turnstile construction wherein a plurality of barrier arms are mounted on a movable support, the arms each being temporarily movable to positions permitting passage of a person through the turnstile when the proper fare has been collected from the person, the improvement wherein said arm includes light transmitting portions visible to persons using the turnstile, a light source, locking means for said arm, means for varying the color of the light visible to a person using the turnstile so that the person using the turnstile can visually determine whether the arm is locked or unlocked, said color varying means being located in a stationary position on the turnstile and said arms being successively movable into alignment with said color varying means as persons pass through the turnstile, and means connecting the fare collecting means to said locking means and to said means for varying the color

whereby the color and the locked condition of the arm are controlled by th fare collecting means.

3,913,718
PARKING METER WITH INCREASED WINDING CAPACITY

Bruno G. Zajac, Harwood Heights, Ill., assignor to Qonaar Corporation, Elk Grove Village, Ill.

Filed Mar. 14, 1974, Ser. No. 451,106
Int. Cl.² G07F 5/00
U.S. Cl. 194—72 **9 Claims**



1. In a coin controlled meter construction for obtaining the purchase of time including means for receiving a coin, a movable winding wheel and drive means carried by the receiving means for operating the winding wheel, the improvement comprising engaging means carried by the winding wheel for limiting the degree of movement of the winding wheel, said engaging means being mounted on said winding wheel for movement therewith, resilietn means normally holding said engaging means in position on the winding wheel, blocking means in the path of movement of said engaging means, said resilient means yielding upon engagement of said engaging means with said blocking means whereby said winding wheel is adapted to continue movement relative to said engaging means after said engagement, and including a stop carried by said winding wheel for engagement with said engaging means after said relative movement to thereby control the full degree of movement of the winding wheel.

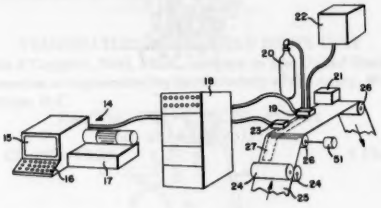
3,913,719
ALTERNATE MEMORY CONTROL FOR DOT MATRIX LATE NEWS DEVICE

James A. Frey, Kettering, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Continuation of Ser. No. 435,030, Jan. 21, 1974, abandoned. This application Feb. 24, 1975, Ser. No. 552,283
Int. Cl.² B41J 5/30; G01D 15/18
U.S. Cl. 197—1 R **7 Claims**

4. The method of continually producing and revising printed material comprising the steps of:

a. transporting a continuous print receiving web at constant speed through a zone in printing relation with a pair of printing rollers,
b. transferring an image from said printing rollers to said web on a repeated basis during passage of the web through said zone and thereby printing a multiplicity of copies of a fixed field of information upon said web,
c. storing in memory a first set of digital data corresponding to a first version of a revisable field of information,
d. gating said first set of digital data repeatedly out of memory in synchronism with the movement of said web,
e. using said first set of digital data as it is gated out of memory, to print multiple copies of said revisable field of information in dot matrix form on said web in registration with associated copies of said fixed field of information,
f. during aforesaid gating out from memory of said first set of digital data preparing a second set of digital data corresponding to a revised version of said revisable field of information,
g. loading said second set of digital data into said memory while continuing to transport said web through said printing zone for printing of said fixed field of information,
h. commencing repeated gating of said second set of digital data out of memory in synchronism with said web movement,
i. discontinuing aforesaid printing use of said first set of digital data,

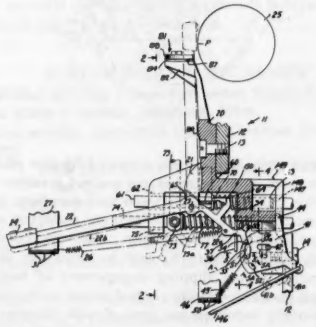


j. using said second set of digital data as it is gated out of memory to print multiple copies of said revised version of said revisable field of information in dot matrix form in registration with associated copies of said fixed field of information, and
k. timing the discontinuance of printing use of said first set of digital data and commencement of printing use of said second set of digital data such that the first copy of said revised version of said revisable field of information is printed in registration with the first copy of said fixed field of information following the copy thereof which is printed in registration with the last copy of said first version of said revisable field of information.

3,913,720
TYPEWRITER WITH YIELDABLE TYPE BAR

George A. Messner, Olathe, Kans., assignor to Thomas B. O'Reilly, Santa Barbara, Calif.

Filed Nov. 21, 1974, Ser. No. 526,004
Int. Cl.² B41J 23/08
U.S. Cl. 197—17 **20 Claims**



1. A typewriter or the like machine comprising type bars, means pivotally supporting said type bars for movement to an imprinting point,

said type bars being yieldable laterally relative to the lengths thereof,

means urging said type bars towards said imprinting point, stationary latch means normally restraining said type bars from movement to said imprinting point,

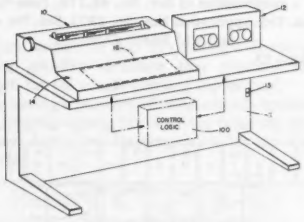
deflecting means for causing said type bars to yield laterally from engagement with said latch means, and

selectively operable means for operating said deflecting means.

3,913,721
SINGLE TAPE EDITING

Harold Stanley Koplow, Peabody; Fritz Eberle, Lowell; Shu-Kuang Ho, Chelmsford, and Edward Lesnick, Carlisle, all of Mass., assignors to Wang Laboratories, Inc., Tewksbury, Mass.

Filed Oct. 9, 1973, Ser. No. 404,692
Int. Cl.² B41J *5/30*
U.S. Cl. 197—19 **9 Claims**



1. An editing typewriter system comprising

a keyboard with

a plurality of symbol printing keys providing alpha-numeric printing signals,

record mode signal means providing a record mode signal, and

edit mode signal means providing an edit mode signal,

type means having a plurality of alpha-numeric printing symbols corresponding to said symbol printing keys, said type means being operable in response to said printing signals to print selected said symbols in a line,

control logic connected to said keyboard means and including temporary storage means for storing said printing signals,

a record unit connected to said control logic and comprising

drive means responsive to said control logic for moving a record medium in forward and reverse directions,

recording means responsive to said control logic for recording signals on a record medium from said temporary storage medium, and

reading means responsive to said control logic for reading signals from a record medium into said temporary storage means,

said control logic including means responsive to said record mode signal to operate said drive means and said recording means to record onto the record medium a position signal and a first set of data signals in precise relationship, said first set of data signals providing a said line of printing signals,

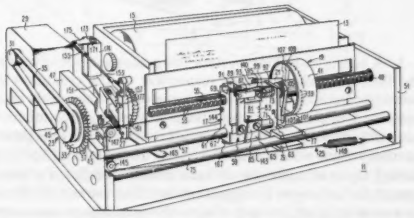
said control logic further including means responsive to said edit mode signal to operate said drive means and said reading means to read a previously recorded position signal from the record medium, and means responsive to said edit mode signal and the reading of said previously recorded position signal while said drive means continues to be operated to operate said recording means to record onto the record medium a replacement set of signals to provide a replacement line of printing signals, superimposed on said first set of data signals,

said previously recorded position signal and said replacement set of data signals being recorded on said record medium in said precise relationship.

3,913,722
DRUM PRINTER

Raymond Ralph Bowdle, Morgan Hills; Robert Junior Laybourn, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 28, 1972, Ser. No. 284,297
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B41J *1/34*
U.S. Cl. 197—54 **5 Claims**



1. A high speed printer for recording characters on a medium comprising:

a rotatable drum having a cylindrical wall of resilient material,

a series of type formations disposed in a helical path on the periphery of said cylindrical wall,

means for feeding the medium past the periphery of said cylindrical wall,

driving means for rotating said drum about the axis of said helical path and at the same time translating said drum longitudinally along said axis so that each type formation will pass in substantially continuous succession past each of a plurality of spaced printing positions on the medium,

a striking member located at least partially inside of said drum and movable by said driving means together with said drum in a longitudinal direction when said drum is translating longitudinally along said axis, and

means for selectively actuating said striking member against the inside surface of said cylindrical wall behind a selected type formation whenever a selected type formation passes one of said printing positions, thereby causing resilient flection of said drum wall to selectively imprint characters on said medium;

said driving means comprising:

a motor,

an elongated drive shaft rotatably driven by said motor,

said shaft having a series of threads formed on its periphery and a longitudinal slot formed on the periphery of said shaft in parallel relationship with the axis of rotation of said shaft,

a slidable carriage having at least one bore formed therein for receiving said drive shaft,

a pivoted and threaded element supported by said carriage and selectively cooperable with the threads on the periphery of the drive shaft for translating said carriage along the longitudinal axis of the drive shaft when said shaft is rotatably driven by said motor and the pivoted element is in threaded engagement with said drive shaft,

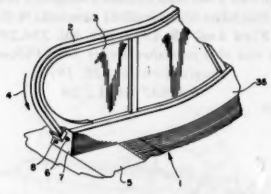
said drum including in addition to its cylindrical wall a hub, and

said hub having a key formed thereon for cooperation with the longitudinal slot of said shaft, so that the drum is rotatably driven by the shaft upon rotation thereof by the motor.

3,913,723
SAFETY SWITCHING FOR PASSENGER CONVEYOR

Ernest D. Johnson, Tallmadge, Ohio, assignor to Westmont Industries, Santa Fe Springs, Calif.

Filed July 9, 1973, Ser. No. 377,794
Int. Cl.² B65B 9/12
U.S. Cl. 198—16 R **14 Claims**

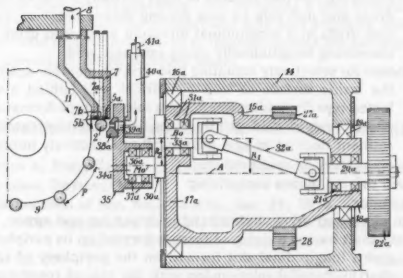


1. A safety switching system for passenger conveyors and the like, comprising means responsive to the condition of a conveyor for stopping the same upon occurrence of an unsafe condition, said means responsive comprising switch means for normally establishing a first circuit for conveyor energization to effect movement thereof in a first direction and for establishing upon occurrence of such unsafe condition a second circuit for conveyor energization to effect movement thereof in a reverse direction, and selectively operable means coupled to said means responsive for restarting said conveyor in reverse direction after said means responsive has sensed occurrence of such unsafe condition.

3,913,724
DEVICE FOR COLLECTING ELONGATED OBJECTS

Jean Verjux, Pavillons-sous-Bois, France, assignor to Usines Decoufle, Paris, France

Filed May 16, 1974, Ser. No. 470,457
Claims priority, application France, May 18, 1973, 73.18121
Int. Cl.² B65G 29/00, 47/52
U.S. Cl. 198—20 C **5 Claims**

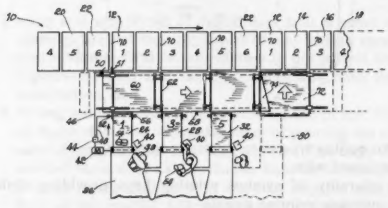


1. Device for collecting cigarettes or similar elongated objects, notably for transferring from a horizontal conveyor to a collector drum rotatably mounted about an axis parallel to said conveyor, which comprises a movable pick-up head and means for moving said pick-up head along an elliptic path tangent to said conveyor, at the level of a pick-up station and positioned in a vertical plane which is also substantially tangent to said collector drum at the level of a distributing station, said elliptic path having a horizontal major axis and one apex of the minor axis located at said pick-up station and one apex of the major axis located at said distributing station, said means for moving said pick-up head being so arranged as to impart thereto, at the apices of its minor axis, a linear velocity parallel and equal to that of said cigarettes travelling on said conveyor, and at the apices of its major axis, a linear velocity parallel and equal to the peripheral velocity of said collector drum, and said pickup-head comprising in said vertical plane tangent to said collector drum a pick-up plate provided with at least one cigarette receptacle, a pair of identical crankshafts having their axes perpendicular to said vertical plane, said pick-up plate being pivotally mounted on the crank arms of said crankshafts, driving means being provided for simultaneously rotating the shaft of each crankshaft with a predetermined throw about a fixed axis perpendicular to said vertical plane, and its crank arm with another predetermined throw about the shaft of said crankshaft, with equal velocities of rotation but in opposite directions, whereby the cigarette receptacle of said pick-up plate is constantly maintained in a horizontal position at all points of its elliptic path.

3,913,725
CONVEYOR LOADING SYSTEM

John Harrison, Lincolnwood, Ill., assignor to The Spra-Con Company, Chicago, Ill.

Continuation of Ser. No. 266,320, June 26, 1972, abandoned, which is a continuation of Ser. No. 45,174, June 9, 1970, abandoned. This application Nov. 26, 1973, Ser. No. 418,880
Int. Cl.² B65G 47/00
U.S. Cl. 198—23 **5 Claims**



1. In a system for loading articles on a conveyor wherein the conveyor comprises article carrying areas, and a transfer means located adjacent the conveyor, said transfer means including spaced apart article engaging means for controlling the movement of articles along said transfer means, means for inserting articles on the transfer means for engagement by said article engaging means, and means for moving articles from the transfer means to the conveyor, the improvement wherein said transfer means extends substantially parallel with said conveyor, said means for moving articles from the transfer means to the conveyor comprising a belt and means for driving said belt in a direction toward said conveyor, said article engaging means comprising pushers, and means moving said pushers over the surface of said belt whereby the pushers continue to engage articles after the articles have been moved from the transfer means onto the belt, means interconnecting said pushers and said conveyor whereby the pushers and conveyor are driven at substantially equal speeds, said belt moving in a direction substantially perpendicular to the conveyor, said engagement continuing until the belt moves the articles onto the conveyor, articles on said belt thereby having a component of movement toward said conveyor and a distinct component of movement imparted by said pusher means.

3,913,726
ARTICLE CARRY TRAY FOR CARRIAGES OF A COMMODITY SORTING SYSTEM

Wallie P. Gray, Chula Vista, Calif., assignor to Rohr Plessey Corporation, Rockville, Md.

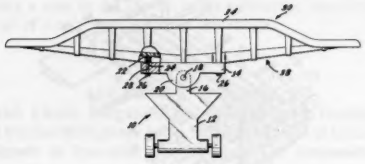
Filed May 2, 1974, Ser. No. 466,222
Int. Cl.² B65G 17/00
U.S. Cl. 198—154 **4 Claims**

1. An article carrying tray comprising:

an integrally formed injection molded polycarbonate foam plastic tray having a generally rectangular article carrying top surface,

said top surface of said tray being substantially smooth and having a coefficient of friction greater than 0.35,

upstanding lips formed along the peripheral edges of two of the opposite sides of said top surface, one of said lips extending upwardly higher than the other,



the bottom surface of said tray having a downwardly protruding grid-like structure that provides reinforcing strength for the article carrying top surface,

said tray having a plurality of ultrasonically installed inserts in its bottom surface for receiving fastening means used to attach said article carrying tray to the top of a carriage assembly.

3,913,727

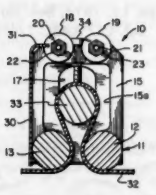
TAKE-UP CLEAT

Romualdas K. Gruodis, Mount Airy, Md., assignor to Fairchild Industries, Inc., Germantown, Md.

Filed Oct. 31, 1973, Ser. No. 411,233

Int. Cl.² B65G *15/44*

U.S. Cl. 198—199 **4 Claims**



1. A take-up cleat for a conveyor belt comprising an elongated housing having an elongated opening in the lower portion thereof for receiving a portion of said conveyor belt comprising two cylindrical members which define the long edges of the elongated opening in the lower portion of said housing, means for engaging the undersurface of a portion of the conveyor belt to force a portion of the conveyor belt into the elongated opening of said housing comprising another cylindrical member located near said first two cylindrical members and means connected to said housing and to said conveyor belt engaging means for varying the position of said conveyor belt engaging means to correspondingly vary the amount of the conveyor belt forced into the elongated opening of said housing.

3,913,728

WIPING DEVICE FOR A CONVEYOR BELT

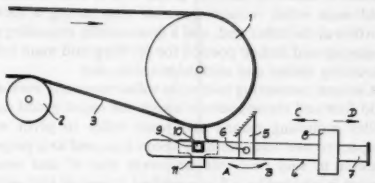
Richard Pott, Lage-Heiden, Germany, assignor to Stahlgruber Otto Gruber & Co., Munich, Germany

Filed Oct. 16, 1973, Ser. No. 406,777

Claims priority, application Germany, Oct. 20, 1972, 7238495

Int. Cl.² B65G *45/00*

U.S. Cl. 198—230 **18 Claims**



1. A wiping device for a conveyor belt comprising an elongated wiping crossbar having a plurality of longitudinal peripheral ribs of wiping material, a movable mounting frame for disposition adjacent the conveyor belt, shaft and socket means mounting the wiping crossbar on the mounting frame with one of its ribs in contact with the conveyor belt, counter-balancing means reacting against the frame for causing the wiping crossbar to bear against the conveyor belt, the socket means comprising polygonal socket means in the mounting frame, the shaft means having a longitudinal axis and, polygonal end surface means fitting within the polygonal socket means and non-rotatably engaging within the polygonal socket means in a number of different angular positions of the shaft and wiping crossbar means about their longitudinal axis, the polygonal socket means having an open side whereby the polygonal shaft end surface means may be inserted therein and removed therefrom, and the ribs on the wiping crossbar being coordinated with the polygonal shaft end surface means, to permit the angular orientation of the wiping crossbar to be varied about its longitudinal axis and selectively fixed in a number of positions related to the ribs whereby different ribs of the crossbar can each be placed into contact with the conveyor belt for renewing the wiping surface after it becomes worn.

3,913,729

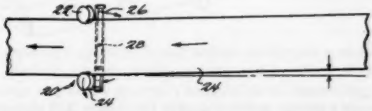
BELT ALIGNER

Donald E. Andrews, Cambridge, Md., assignor to Cambridge Wire Cloth Company, Cambridge, Md.

Filed Aug. 11, 1972, Ser. No. 279,783

Int. Cl.² B65G *15/62*

U.S. Cl. 198—202 **6 Claims**



1. A belt aligner comprising:

a main roller,

means for mounting said main roller so as to permit rotation thereof about a first axis,

first and second edge sensor means for contacting opposite edges of a belt respectively,

a base member,

means pivotably mounting said main roller mounting means on said base member,

means pivotably mounting said first and second sensor means on said base member downstream of said roller including sensor pivot means pivotably connecting said

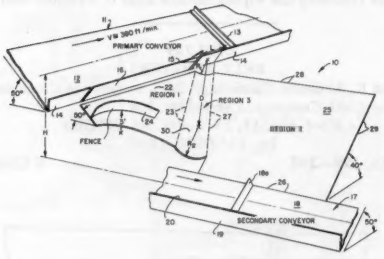
first and second sensor means to said base member so as to define a sensor pivot arm which pivots about a vertical axis perpendicular to said first axis for each of said sensor means, each pivot arm extending parallel to the sensor pivot arm of the other sensor means, including an arm member for each sensor means having a sensor means attached at one end and pivotably connected to said base member at the other end so as to define a pivot arm for each sensor means extending parallel to the pivot arm for the other sensor means, a further member rigidly attached to said arm member at one end to extend beneath said main roller mounting means and having a forked portion at the other end, and a downwardly extending pin engaging said forked portion for pivoting said main roller mounting means and said main roller, and

pivot means connecting said main roller mounting means to said first and second sensor means for causing said main roller mounting means and main roller to pivot with respect to said base member about a second axis perpendicular to said first axis whenever one of said sensor means is pivoted by a force applied to one of said sensor means by a belt edge including means defining a roller pivot arm extending beneath said main roller mounting means and connected to said sensor pivot means, and means fixed to said main roller mounting means for engaging said pivot arm defining means to pivot said main roller mounting means as said pivot arm defining means is pivoted about said second axis.

3,913,730
ARTICLE TRANSFERRING APPARATUS

Romualdas K. Gruodis, Mount Airy; Bernard C. Botula, Gaithersburg, and Wojslaw J. Milan-Kamski, Germantown, all of Md., assignors to Fairchild Industries, Inc., Germantown, Md.

Filed Mar. 8, 1974, Ser. No. 449,508
Int. Cl.² B65G *15/60*
U.S. Cl. 198—205 **3 Claims**

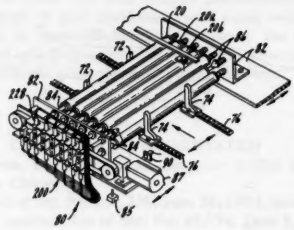


1. Apparatus comprising a canted conveyor having a lower edge portion, article retaining means located adjacent to the lower edge portion of said canted conveyor, gate means for permitting articles to move off of said conveyor, said gate means having a forward portion facing in a direction against the direction of motion of said conveyor and an aft portion located at the opposite end thereof, said article retaining means having means for slidably receiving said gate means and said gate means being slidable therein, said gate means having a projection extending upward from the upper aft portion thereof for diverting articles upward which come in contact with said projection when said gate means is in an open position, and means for actuating said gate means.

3,913,731
PACKAGING MACHINE

Clyde H. Purdom, Memphis, Tenn.; Kenneth W. Allum, South Haven, Miss., and Harold D. Shackelford, Memphis, Tenn., assignors to Cleo Wrap Corporation, Memphis, Tenn.

Division of Ser. No. 290,845, Sept. 21, 1972, Pat. No. 3,798,871. This application Nov. 2, 1973, Ser. No. 412,345
Int. Cl.² B65G *47/24*
U.S. Cl. 198—261 **13 Claims**



1. An apparatus for orienting each of the axial edges of the outer convolution of material wound upon a plurality of rolls wherein each of said axial edge may be oriented in a preselected radial direction, comprising:

means for simultaneously conveying said plurality of rolls to a sensing station;

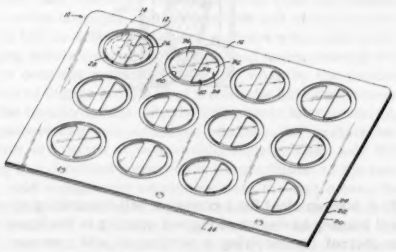
means for simultaneously engaging the ends of each of said rolls and means for simultaneously rotating each of said rolls about their longitudinal axes;

means for simultaneously sensing the locations of the axial edges of each of said rolls while said rolls are rotating; and means responsive to said sensing means whereby each of said rolls cease to rotate at a preselected location individually selected for each of said rolls thereby enabling each of said axial edges to be individually oriented in a preselected radial direction.

3,913,732
COIN DISPLAY PAGE

Everett A. Peterson, 113 St. Marks Place, Roslyn Heights, N.Y. 11576

Filed Jan. 11, 1974, Ser. No. 432,696
Int. Cl.² A45C *11/28*
U.S. Cl. 206—.83 **8 Claims**



1. A coin display page comprising a first sheet of thermoplastic material having a plurality of translucent embossments formed thereon, said embossments each including a flat surface portion extending above the plane of said first sheet, parallel to said one side thereof, and a peripheral wall extending from said flat surface to the plane of said first sheet, thereby to define a plurality of coin receiving recesses which open towards the side of said first sheet opposite said one side; and a second sheet of thermoplastic material permanently heat sealed to said first sheet adjacent said opposite side

thereof and having a plurality of apertures formed therein respectively located adjacent said recesses to permit insertion of individual coins in said recesses whereby access to said recesses is only through the apertures in said second sheet and one side of the coin in a recess is visible through the flat surface portion of the embossment defining the recess and the edge of the coin is visible through the side wall of that embossment; said apertures in said second sheet each comprising a pair of spaced openings in said second sheet defining therebetween a band integral with said second sheet and extending across its associated recess; said bank forming means for retaining a coin in the recess, while permitting insertion and removal of a coin into and from the recess.

3,913,733

ADHESIVE CARTRIDGE

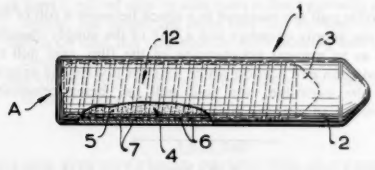
Friedrich Flesch, Emmendingen; Adolf Bappert, Denzlingen, and Marlen Striegel nee Kloss, Windenreute, all of Germany, assignors to Upat-Max Langensiepen KG, Emmendingen, Germany

Filed May 3, 1973, Ser. No. 356,749

Claims priority, application Germany, May 5, 1972, 2222013

Int. Cl.² B56D *81/32, 25/08*

U.S. Cl. 206—219 **4 Claims**



1. An adhesive cartridge for anchoring of an object in a hole, comprising an outer frangible ampoule adapted for insertion into a hole and having an inner circumferential surface; an inner frangible ampoule received in said outer ampoule with radial clearance and having an outer circumferential surface; a first component of a two-component adhesive accommodated in said inner ampoule; and a strip of a second component of said adhesive helically convoluted on one of said surfaces, surrounding said inner ampoule and extending substantially across said clearance towards the other of said surfaces, the convolutions of said strip being spaced from one another so as to facilitate intermixing of said components upon fracturing of said ampoules.

3,913,734

PACKAGE ASSEMBLY

Harold B. Siegel, Clearwater, Fla., assignor to Pharmacare, Inc.

Continuation-in-part of Ser. No. 277,586, Aug. 3, 1972. This application Mar. 7, 1974, Ser. No. 448,962

Int. Cl.² B65D *5/54*

U.S. Cl. 206—498 **9 Claims**

1. A package assembly comprising: backing means, container means mounted on said backing means; container opening means comprising a weakened segment formed on said container means in predetermined position, hinge means formed in said backing means adjacent said weakened segment, lid means defined by predetermined portions of said backing means and said container means and interconnected to the remainder of said package assembly at least in part by said hinge means, nozzle means formed on said container means and including separable portions, said weakened segments disposed in transverse intercepting relation to said nozzle means, said nozzle means disposed and configured to be seperable along said weakened segment, said nozzle means including portions contiguous to said weakened segment having relative corresponding configurations, whereby said nozzle portions are reclosable in sealing relation to each other along said weakened segment, said backing means comprising a plurality of flexible elements integrally attached to one another in substantially stacked relation, at least one of said flexible elements comprising material incorporating memory capabilities, fold line means formed in said backing means and disposed adjacent to said weakened segment and at least partially defining said hinge means, said hinge means including a biasing means defined by said one flexible element of memory capabilities disposed within said fold line, whereby said lid means is biased in part toward its reclosable position after separation along said weakened segment; said backing means being flexible, whereby force applied to said lid means severs said weakened segment and allows pivotal movement of said lid means about said fold line relative to the remainder of said package assembly.

3,913,735

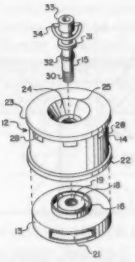
CONTAINER FOR HOLLOW CYLINDRICAL OR GENERALLY TOROIDAL PARTS

David R. Durbin, 2024 Culpepper, Dallas, Tex. 75235

Filed June 22, 1973, Ser. No. 372,477

Int. Cl.² B65D *85/02, 85/30*

U.S. Cl. 206—303 **9 Claims**



1. A generally cylindrical and hollow reinforced container for the loading, storage, lifting, rolling and handling of relatively large and heavy generally toroidal parts comprising:

a generally flat, reinforced cylindrical base having a diameter greater than that of the part for the lateral underlying support and securement thereof, and having a relatively narrow profile for facilitating the positioning of the part thereon;

said base having a centered upstanding keeper-ring of relatively shallow height mounted thereto for facilitating the loading of the part thereon and its secured positioning during rolling and handling;

said ring being of smaller diameter than the inner diameter of the part;

said base further having a threaded bore formed centrally therein of relatively shallow height for facilitating the loading and securing of the part therearound;

a hollow generally cylindrical cover proportioned to fit on said base, of a height greater than the thickness of the part;

first and second ring elements circumferentially formed in spaced relationship around said cover, said ring elements having substantially equivalent diameters greater than that of the cover for providing a means for the handling and rolling of said part when positioned therein;

said first ring element formed around the lower edge of said cover and projecting downwardly therefrom for engaging said base when positioned thereon, and providing a reinforcing structure to facilitate the rolling of the part when positioned therein;

said second ring element formed around the upper edge of said cover providing a reinforcing structure for said cover and gripping means for tipping said cover onto its side for the rolling thereof upon said first and second ring elements therearound;

said cover further being provided with a downwardly oriented projection positioned to bear against an upwardly presented surface of the part when it is positioned upon said base and within said cover for securing the part therebetween;

said cover further being centrally apertured in axial alignment with said threaded bore of said base when said cover is placed over it;

and an elongated connecting bolt having a threaded portion upon one end suitably formed for engagement with said threaded bore in said base, said bolt having a portion distant from said threaded portion configured to engage and bear upon a portion of said cover when said bolt is positioned to pass through said aperture, therein securing said cover against said part and said base for the lifting and rolling transport thereof.

3,913,736

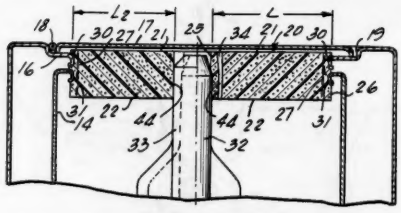
PACKING BRACE FOR A WASHING MACHINE

Francis P. Brennan, 1057 Rolling Drive, Lisle, Ill. 60532

Filed Mar. 29, 1973, Ser. No. 346,058

Int. Cl.² B65D *81/06, 85/00*

U.S. Cl. 206—320 **6 Claims**



1. A packing brace selectively adapted for use in a washing machine having a casing, a tub within said casing and either a thick or thin center post within said tub, comprising:

a plurality of cooperating generally rectangular blocks, each having top, bottom, side and end walls,

a through-recess extending from the top wall to the bottom wall of each block inwardly of one end thereof an forming a relief area generally conforming the adjacent end wall to the form of the center post when the end wall is displaced therein as the packing brace is disposed between the casing, tub and center post of the washing machine, and slot means extending between the inside and the outside of the block in the vicinity of the through-passage and forming a frangible area for facilitating the selective breaking away of the portions of said block outwardly of said relief area to selectively foreshorten the effective length of the block and maintain the foreshortened end wall to conform to the circumferential portion of the center post engaged thereby.

3,913,737

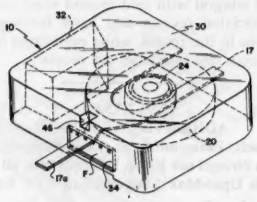
FILM CARTRIDGE

Archie J. Tucker, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 30, 1974, Ser. No. 465,455

Int. Cl.² B65D *85/67*; **B65H** *17/48*

U.S. Cl. 206—408 **4 Claims**



1. In a film cartridge having walls defining a supply chamber for a roll of film or the like having a tendency to become sidestepped in an axial direction, the improvement comprising:

a flexible pull tab received in a space between a roll of film in the supply chamber and a wall of the supply chamber so as to prevent sidestepping of the film, said pull tab having an end portion which extends toward the exterior of the cartridge, and said pull tab being removable through an opening in said cartridge.

3,913,738

MULTI CONTAINER PACKAGE AND CARRIER

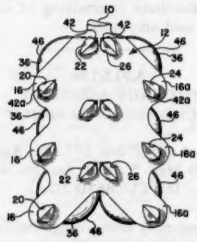
Robert C. Olsen, Wheeling, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed May 3, 1973, Ser. No. 357,057

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B65D *25/22, 75/24, 85/62*

U.S. Cl. 206—427 **11 Claims**



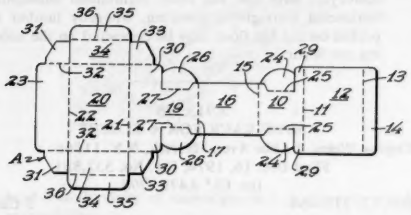
1. A package of filled and sealed pouch-like containers each with closed ends presenting corner portions of maintained integrity and relative stiffness, and carrier means including a pair of end support members connected by a strap portion, and each end member having groups of recess means with the recess means of each group oriented in accordance with the spacing arrangement of the corner portions of an adjacent container in the package and wedgingly receiving and interlocking with adjacent corner portions trapping the containers in the package for handling and transport.

3,913,739

MULTIPLE CAN COMBINATION PACKAGE

Russell J. Hennessey, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Sept. 10, 1973, Ser. No. 395,990
Int. Cl.² B65D 65/00, 5/48
U.S. Cl. 206—434 5 Claims



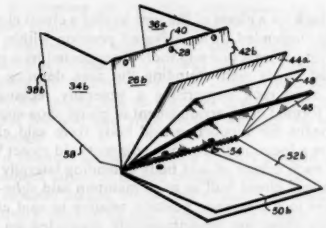
1. A multiple can combination package including:
an outer sleeve including a top wall, opposed first and second side walls, and a bottom wall secured in rectangular relation,
a partition dividing said outer sleeve into first and second compartments,
at least a pair of side-by-side cans at least partially enclosed within, and projecting from said first section,
means on said top and bottom walls holding said cans enclosed within said sleeve, and
end closure flaps operable, when folded, to close the ends of said second compartment.

3,913,740

FOLDER FOR OVERHEAD PROJECTOR AND EASEL USE

Aaron M. Bisberg, P.O. Box 14, North Station, White Plains, N.Y. 10603

Filed Apr. 5, 1973, Ser. No. 348,368
Int. Cl.² B65D 5/52; G03B 21/00
U.S. Cl. 206—472 6 Claims



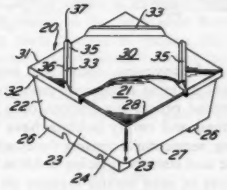
1. A folder for the storage of transparencies in a loose-leaf binder and for their use in overhead projection and easel arrangement comprising a rectangular cover leaf, a plurality of independent transparencies, means pivotally joining said cover leaf and said transparencies along one edge so as to be pivotable about said edge, and a pair of enclosure leaves integral with the edges of said cover leaf adjacent said pivotally mounted edge of said cover leaf, said enclosure leaves on their edges adjacent said pivotal joinder being tapered so as to be capable of forming an easel for the inclined cover leaf in one opened position, said cover leaf and transparencies being provided with holes aligned along said one edge, the holes of said transparencies being slightly larger than the holes of said cover leaf whereby said cover leaf can snugly engage positioning pins of an overhead projector coupler whereas said transparencies can be relatively freely mounted on said pins, said cover leaf including a tab projecting along the edge by which it is joined to one of said enclosure leaves, said tab being struck out of said one enclosure leaf, and said cover leaf being provided with holes aligned along the edge opposite said one edge, said holes being adapted to engage the rings of a loose-leaf binder.

3,913,741

MATERIALS HANDLING CONTAINER

James E. Pirie, 1404 Bayview Ave., Barnegat Light, N.J. 08006

Filed Oct. 3, 1973, Ser. No. 403,176
Int. Cl.² B65D 21/02
U.S. Cl. 206—508 9 Claims



1. A container comprising a bottom wall, a peripheral side wall upstanding circumferentially about said bottom wall, skid means depending from the underside of said bottom wall for supporting engagement with a nether surface, a top wall spaced over said bottom wall and gravitationally resting removably on the upper edge of said side wall, and reinforcing ribs carried by said top wall on the upper side thereof and extending between spaced regions of said top wall located over and resting on nether spaced upper edge regions of said side wall, said reinforcing ribs and skid means being located so that the skid means of an additional identical container superposed over said top wall rests only on said reinforcing ribs and not on said top wall to distribute the entire weight of said additional container through said ribs to said side wall, so that said top wall does not carry appreciable load except through said ribs.

3,913,742

FLOTATION OF OXIDE MINERALS IN HOT PULP

Heikki Reino Laapas, Neljas linja 14 C 70, 00530 Helsinki 53, Finland

Filed May 24, 1974, Ser. No. 473,320
Claims priority, application Finland, May 29, 1973, 1721/73
Int. Cl.² B03B 1/02
U.S. Cl. 209—11 4 Claims

1. In a method of concentrating ironbearing oxide minerals such as ilmenite, chromite, hematite and magnetite by flotation which includes the steps of: (a) activation wherein an activating agent of cations of the metals of atomic weight over 40 is added to the pulp for improving the effectiveness of the collector, (b) conditioning wherein the collector is added to the pulp, (c) depressing wherein a gangue depressant is added for depressing the gangue minerals, and (d) flotation for separating the concentrate of minerals, the improvement which comprises: performing both the activation and conditioning steps within the temperature range of 80°–100°C, and the flotation step within the temperature range of 50°–80°C.

3,913,743

SINGLE CONVEYOR SYSTEM FOR BOBBINS ABOUT A TEXTILE APPARATUS

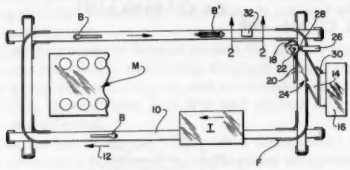
John Nelson, North Kingstown, R.I., assignor to Leesona Corporation, Warwick, R.I.

Filed Sept. 19, 1973, Ser. No. 398,597

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B07B *1/15*

U.S. Cl. 209—73 11 Claims



7. A method of conveying wound and empty bobbins on conveying means defining a common path around a plurality of stationary strand processing stations on a textile machine where said wound and empty bobbins have butt and apical ends comprising, sequentially sensing the condition of bobbins being wound at said stations, placing bobbins having a predetermined amount of yarn wound thereon on said conveying means, concurrently conveying said empty bobbins to said stations and said wound bobbins away from said stations on said conveying means, detecting a wound bobbin on said conveying means, producing a signal in response to detection of said wound bobbin, and removing said wound bobbin from said conveying means in response to said signal.

3,913,744

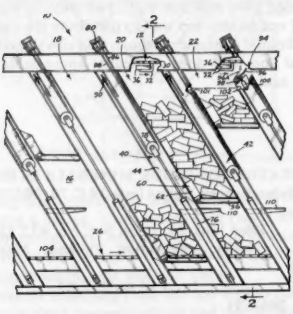
LUMBER SORTER APPARATUS

Donald B. Turner, and Gary F. Thomas, both of 9250 N. Decatur St., Portland, Oreg. 97203

Continuation of Ser. No. 363,430, May 24, 1973, abandoned. This application Aug. 12, 1974, Ser. No. 496,545

Int. Cl.[2] B07C *9/00;* B61D *45/00*

U.S. Cl. 209—74 R 12 Claims



1. A lumber sorter comprising

a lumber-carrying conveyor operable to carry lumber along a path adjacent a plurality of sorting stations,

means for ejecting lumber from said conveyor at selected sorting stations, and

lumber-receiving bins underlying said conveyor at said stations into which lumber may fall when ejected from the conveyor, a bin including a pair of spaced-apart, facing, inclined bin walls inclined in the same direction from the vertical, and a substantially horizontal bin floor extending between said bin walls,

an unloading conveyor underlying a bin having an upper surface adapted to receive and carry lumber away from the bin, and

means mounting said bin floor for movement between a raised position adjacent the upper ends of the bin walls for receiving lumber when the bin is empty and a lowered position below the level of said surface of the unloading conveyor, with the bin floor maintained substantially horizontal throughout lowering, whereby lumber supported on the bin floor may be deposited on the unloading conveyor.

3,913,745

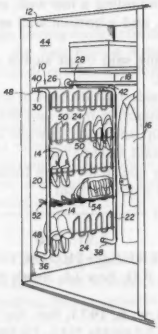
SHOE RACK FOR A CLOSET

Eugene Weiss, 2 Alice Ave., Merrick, N.Y. 11566

Filed Dec. 16, 1974, Ser. No. 532,851

Int. Cl.[2] A47F *7/08*

U.S. Cl. 211—34 5 Claims



1. A shoe rack for a closet of the type having a closet clothes rod which is suspended in an elevated position within said closet by having at least one end thereof supported by a vertically oriented closet wall bounding the area defining said closet, said shoe rack comprising a generally rectangular planar body formed of an arrangement of plural shoe-support members, means for supporting said body from said closet clothes rod in a location therealong adjacent said closet wall, and a leg at each corner of said body extending laterally into contact with said closet wall so as to maintain said shoe-support members in a clearance position relative to said closet wall, whereby shoes are advantageously supported on said shoe-support members with the soiled soles thereof facing into said clearance so as not to soil any clothes in said closet.

3,913,746

UTILITY GUN RACK FOR BOATS AND THE LIKE

Henry A. Burton, 855 Harrigan Road, Fallon, Nev. 89406

Filed Mar. 7, 1974, Ser. No. 448,812

Int. Cl.[2] A47B *81/00;* F16M *13/02*

U.S. Cl. 211—64 5 Claims

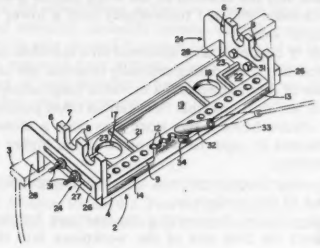
1. A utility gun rack adapted to be mounted on the rail of a boat, comprising:

a. an elongated plate-like base member;

b. end plates mounted adjacent opposite ends of the base member and projecting in a direction away from the rail on which the rack is mounted and having notches within and between which a gun may be cradled;

c. clamp means mounted adjacent each end of the base member and operatively adjustable to secure the utility gun rack to a boat rail on one side of the boat; and

d. means disposed above said base member a predetermined distance less than the length of a cartridge and adapted to



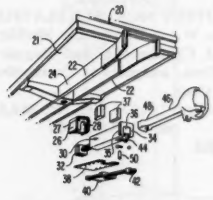
hold a multiplicity of cartridges in a position for ready accessibility.

3,913,747

COUPLER PIN RETAINER

Donald L. Crummett, Joshua, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed July 19, 1974, Ser. No. 489,894
Int. Cl.² B61G 9/02
U.S. Cl. 213—8 **17 Claims**



1. A coupling pin retaining mechanism for a railway car coupler assembly including a coupler bar, yoke means generally longitudinally aligned with said coupler bar and being operably connected to a railway car underframe, removable coupling pin means operable to connect said coupler bar to said yoke means and to transmit draft forces between said coupler bar and said yoke means, wherein the improvement comprises:

a. a channel formed within a bottom portion of said yoke means adjacent to said coupling pin means;

b. retainer means, connected to said yoke means for selectively underlying said coupling pin means and retaining said coupling pin means in an operative posture with respect to said yoke means and said coupler bar and for selectively moving to a supported inoperative position within said channel which permits removal and reinsertion of said coupling pin means from said coupler assembly and to an operative position underlying said coupling pin means.

3,913,748

RAILWAY CAR CUSHIONING DEVICE

Ross G. Carle, Houston, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Nov. 7, 1974, Ser. No. 521,702
Int. Cl.² B61G 9/16
U.S. Cl. 213—8 **7 Claims**

7. A single acting hydraulic fluid cushioning unit adapted to be positioned between an underframe fixed center sill and a sliding sill of a railway car comprising: an outer high pressure hydraulic fluid cylinder, a metering piston mounted within said outer cylinder, a piston rod secured to one side of the metering piston and having an end portion extending through an end of the outer cylinder outwardly thereof, an inner low pressure hydraulic fluid cylinder secured to the other side of the metering piston and extending through the opposite end of the outer cylinder outwardly thereof, said inner cylinder having a freely floating piston therein dividing said inner cylinder into a variable volume inner hydraulic fluid chamber and an outer variable volume gas return chamber, and a metering

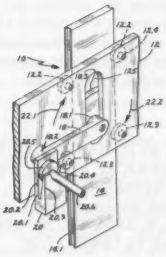
opening formed adjacent the outer circumference of the metering piston to permit a flow of metered fluid from one side of the metering piston to the other side thereof, said inner cylinder having ports therein to receive the metered fluid upon relative extended movement between the outer cylinder and piston rod, and said floating piston upon said relative extended movement pressurizing the gas within the gas return chamber for return of the cushioning unit to neutral position.

3,913,749

WAFER BASKET TRANSFER APPARATUS

Joseph H. Wyers, Excelsior, Minn., assignor to Fluoroware Systems Corporation, Chaska, Minn.

Filed Aug. 12, 1974, Ser. No. 496,519
Int. Cl.² F16H 25/14
U.S. Cl. 214—1 BD **9 Claims**



1. A wafer basket transfer apparatus for transferring baskets of semi-conductor wafers from one processing tank to an adjacent tank, comprising a stationary frame plate, a slide plate slideably mounted for vertical sliding movement relative to the frame plate, a basket lifting arm having a basket lifting hook at one end, drive means including a shaft in driving engagement with the other end of the lifting arm to rotate the arm in a vertical plane, said shaft being mounted for rotation in the slide plate and for vertical movement with respect to the frame plate, a cam mounted for rotation with the shaft, and a cam follower mounted on the frame plate and cooperating with the cam to raise and lower the slide plate with respect to the frame plate as the lifting arm rotates, the lifting arm being so oriented with respect to the cam as to carry the lifting hook in a curved, vertically elongated overhead path with respect to the frame plate, whereby a wafer basket may be lifted from a processing tank generally vertically upwardly to a substantial height and may be lowered generally vertically into an adjacent tank with the wafer basket clearing the tank edges.

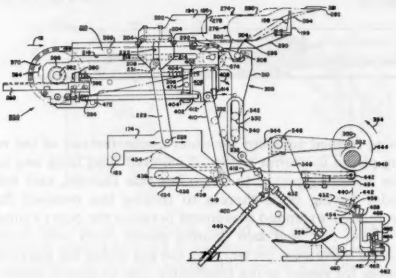
3,913,750
FEED, TRANSPORT AND DELIVERY MECHANISM

Ernest J. Sarring, Western Springs, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Division of Ser. No. 298,131, Oct. 16, 1972, which is a division of Ser. No. 114,225, Feb. 10, 1971, Pat. No. 3,722,336. This application Nov. 15, 1974, Ser. No. 524,305

Int. Cl.² B65G *59/06*

U.S. Cl. 214—1 BB **4 Claims**



1. A mechanism for feeding books and the like to a cutting station of a trimmer comprising, a table, a hopper for supporting a stack of books on said table and having at least one wall that is adjustable with relation to the width of the books to be trimmed, carriage means for supporting said adjustable wall, prestripper means mounted for reciprocation below said hopper for stripping each succeeding lowermost book in turn partially from beneath said stack and advancing it to a predetermined position, drive means including a control element mounted on said carriage means for reciprocating said prestripper means through a feed and return stroke the length of which is dependent upon the width of the books to be trimmed, and mechanism for shifting the position of said carriage means and therewith said control element to thereby adjust said adjustable wall and simultaneously vary the length of said feed and return stroke of said prestripper means with direct relation to the width of the books.

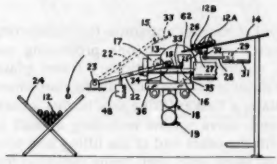
3,913,751
APPARATUS FOR AUTOMATICALLY FEEDING AND REMOVING CYLINDRICAL BODIES TO AND FROM A WORKING HEAD

Robert Friedman, Seven Sherman Ave., Closter, N.J. 07624

Filed Dec. 6, 1974, Ser. No. 530,182

Int. Cl.² B65H *51/26*

U.S. Cl. 214—1 PB **5 Claims**



1. An apparatus for automatically feeding and removing cylindrical bodies to and from a working head, the apparatus comprising in combination:

a work tray with an upwardly opened channel arranged to hold the bodies one at a time therein in a longitudinal orientation;

a feed ramp transversely adjacent and above the work tray and adapted to receive a plurality of the bodies therein, the feed ramp inclined toward the work tray so that the bodies in the feed ramp tend to roll toward the work tray, the feed ramp provided with a delivery crank which is movable to deliver a lowermost of the bodies so that it rolls into the channel of the work tray as a workpiece;

the channel inclined transversely with a lower side and a higher side;

a pair of clamping jaws mounted on a movable carriage and including a fixed longitudinally oriented jaw at the higher side of the channel and a movable longitudinally oriented jaw which is movable between an open position wherein it clears beyond the work tray and a closed position wherein it grips the workpiece at the higher side of the channel;

a threader head organized to receive longitudinally a first end of the workpiece;

moving means for moving the carriage longitudinally to insert the first end of the workpiece into the working head;

return means for removing the first end of the workpiece from the working head back to the channel;

means for moving the movable jaw to its open position so that the workpiece is allowed to roll to the lower side of the channel and the movable jaw clears the work tray;

the work tray connected to an ejector crank which is pivotally mounted about a longitudinal axis;

means for flipping the ejector crank whereby the workpiece is ejected transversely from the work tray.

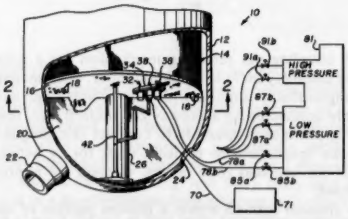
3,913,752
REMOTELY MOVABLE PLATFORM

Charles Theodore Ward; Donald Lee Mathis; Frank Taylor Radcliff, all of Chattanooga, and Eugene Ranger, East Ridge, all of Tenn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 1, 1973, Ser. No. 384,657

Int. Cl. B25j *9/00*

U.S. Cl. 214—1 BB **8 Claims**



1. A carriage for remotely controlled travel laterally of the surface of a member having a plurality of laterally spaced longitudinally extending openings in said surface thereof, comprising:

a. a base;

b. a stepping mechanism for said base including at least two substantially parallel fingers connected to said base and extending outward therefrom and being reciprocably movable in a first direction between extended and retracted positions relative to said base and sized for insertion in said member openings and at least one said finger being linearly movable relative to said base a predetermined extent and in a second direction extending in a plane substantially normal to the longitudinal extent of said finger to step said base;

c. means for supporting said base proximate said surface of said member to allow insertion of said fingers in said openings in their said extended positions and to prevent said insertion in said retracted position;

d. first remotely actuable means for selectively extending and retracting each said finger;

e. second remotely actuable means for linearly moving said at least one finger relative to said base in a said second direction extending in said plane substantially normal to said finger; and

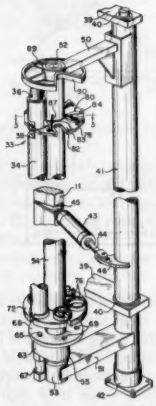
f. means for controlling actuation of said first and said second remotely actuable means, whereby said relative motion in said second direction between said at least one finger and said base acts to advance said base laterally relative to said member when said at least one finger is extended into said opening.

3,913,753

DRILL PIPE HANDLING AND STORAGE DEVICE

Richard H. Swartz; Richard J. Pearce, and James M. Bowe, all of Gainesville, Fla., assignors to Driltech, Inc., Gainesville, Fla.

Filed Aug. 29, 1974, Ser. No. 501,732
Int. Cl.² E21B *19/14*
U.S. Cl. 214—2.5 **9 Claims**



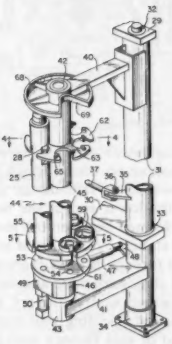
2. A magazine for handling and storing at least one elongated drill pipe section having at least one first flattened portion at the lower end and at least one second flattened portion spaced from said first flattened portion and being out of axial alignment therewith, said magazine comprising a shaft, a seat plate mounted on said shaft, said seat plate having an opening complementary to the lower end of said drill pipe section, latch means mounted on said shaft and spaced from said seat plate a distance substantially corresponding to the distance between the first and second flattened portions of the drill pipe section, said latch means having a generally C-shaped opening communicating with the periphery thereof, a latch member rotatably associated with said C-shaped opening of said latch means, said latch member having a normally open slot for complementarily receiving the second flattened portion of said drill pipe section, whereby the second flattened portion of a drill pipe section is introduced into the slot of said latch member after which the drill pipe section and the latch member are rotated to close the latch member slot and align the first flattened portion of the drill pipe section with the opening of the seat plate so that the drill pipe section may be received therein.

3,913,754

PORTABLE DRILL PIPE MAGAZINE

Richard H. Swartz; Richard J. Pearce, and James M. Bowe, all of Gainesville, Fla., assignors to Driltech Inc., Gainesville, Fla.

Filed Sept. 11, 1974, Ser. No. 504,937
Int. Cl.² E21B *19/14*
U.S. Cl. 214—2.5 **5 Claims**



5. The combination of a plurality of drill pipe sections and a magazine for removably supporting the same, each of said drill pipe sections comprising an elongated generally cylindrical body having upper and lower ends, said body having at least one relatively short non-circular portion extending upwardly from said lower end and having at least one relatively long non-circular portion located in spaced relationship to said upper end, the plane of said upper non-circular portion being disposed at a predetermined angle relative to the plane of said lower non-circular portion, said magazine comprising an elongated generally vertical shaft, a seat plate fixed to said shaft adjacent one end and a holder fixed to said shaft adjacent the other end, said seat plate having a plurality of openings of a configuration corresponding to the lower non-circular portion of the drill pipe sections, said holder having a plurality of openings substantially in vertical alignment with the openings of said seat plate, each of the holder openings communicating with the periphery of the holder through a relatively wide mouth, said mouth being of a width to receive the long non-circular portion of a drill pipe section, stop means carried by said holder in a position to engage the long non-circular portion of said drill pipe section when the drill pipe section is rotated within a holder opening, and said stop means being located in a position such that the short non-circular portion at the lower end of said body is aligned with the non-circular opening in said seat plate when the long non-circular portion is in abutting relationship with said stop means, whereby a drill pipe section is inserted into an opening in the holder and rotated so that the long non-circular portion is in abutting relationship with the stop means and thereafter the drill pipe section is moved axially so that the lower end of the drill pipe section is received within an opening in said seat plate.

3,913,755
DISCHARGING DEVICE OF A SHAFT FURNACE HAVING COOLING MEANS

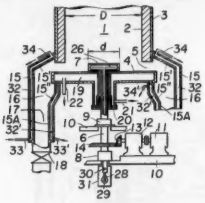
Kenjiro Kambara, Sakai; Sakae Tanaka, and Satoru Miyasita, both of Himeji, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 24, 1974, Ser. No. 463,687

Claims priority, application Japan, May 10, 1973, 48-51794; June 5, 1973, 48-66447

Int. Cl.² C21B 7/14

U.S. Cl. 214—18 V **4 Claims**



1. In a discharging device with cooling means provided in a shaft furnace the bottom portion of which has a circular shape in horizontal cross-section, said device having a stationary table provided at the lower end of the furnace wall with an annular clearance formed between the lower end of said furnace wall and said stationary table so as to permit the materials charged in said furnace to pass therethrough and a rotor located above said stationary table and supported by a rotary shaft extending through said stationary table, the improvement comprising a first shielding wall extending downwardly from the lower end of said furnace wall past said stationary table, a second shielding wall extending downwardly from the bottom of said stationary table to the same level as the bottom of said first shielding wall, said first and second shielding walls forming a passage therebetween for the discharge of said material, a shut-off valve located at the bottom of said passage to control the rate of discharge of said material from said passage, a sealing member for sealing the clearance between said rotary shaft and said stationary table so that the rotor and the material inside said furnace and passage do not come into direct contact with outside air, and said rotor comprises a symmetrical body having a major and a minor radius, the ratio of the major radius to the minor radius being within the range of 1.2–2.0.

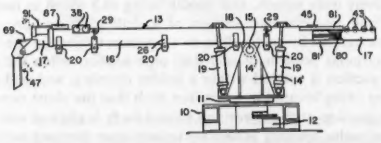
3,913,756
LADLE SKIMMER

George E. Barron, and Harry Pavone, both of Verona, Pa., assignors to Louis A. Grant, Inc., Pittsburgh, Pa.

Division of Ser. No. 216,997, Jan. 11, 1972, Pat. No. 3,800,965. This application Feb. 11, 1974, Ser. No. 442,006

Int. Cl. B66c 23/04

U.S. Cl. 214—32 **2 Claims**



1. In a skimming mechanism having a supporting structure, a boom assembly movably mounted on said structure, said boom assembly having telescoping outer and inner boom sections, anti-friction means guidably supporting said inner boom section for reciprocative movement within said outer boom section, a skimming paddle carried on the forward end of said inner boom section, and power drive means for effecting reciprocative movement of said inner boom section within said outer boom section, the improvement comprising a pair of cushioning cylinders fixed externally at the front end of said outer boom section, one of said cylinders having a forwardly projecting piston rod and the other of said cylinders having a rearwardly projecting piston rod, rod means on said inner boom section in coaxial alignment with the piston rod of said one cylinder engageable therewith adjacent the extremity of retraction of said inner boom section to define the limit of retractive movement thereof, and means including means fixed on said inner boom section adjacent the rear end thereof for cooperatively engaging the rearwardly projecting piston rod of said other cylinder adjacent the extremity of extension of the inner boom section to define the limit of extension of the inner boom section.

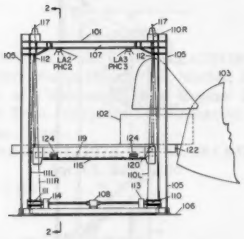
3,913,757
CONTROL SYSTEM FOR LOAD CARRIER AND ASSOCIATED TRANSFER APPARATUS

George Leslie Lovey, East Lake, Ohio, assignor to Otis Elevator Company, New York, N.Y.

Filed Nov. 14, 1974, Ser. No. 523,935

Int. Cl.² B65G 67/02

U.S. Cl. 214—38 BA **7 Claims**



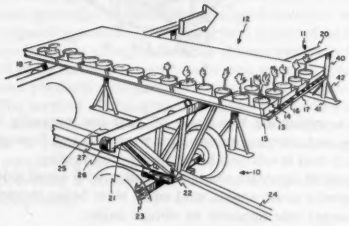
1. A control system for a load carrier and associated transfer apparatus each supporting cargo conveying equipment, said transfer apparatus being disposable in a first condition in which its conveying equipment is capable of transferring cargo to and from conveying equipment aboard an aircraft through an opening in its nose when it is appropriately positioned adjacent one end of said transfer apparatus, said transfer apparatus also being disposable in a second condition in which its conveying equipment is capable of transferring cargo to and from the conveying equipment of said load carrier when it is appropriately located adjacent the end of said transfer apparatus opposite its aircraft end, said control system comprising first switch means; first control means operating in response to the operation of said first switch means to cause said transfer apparatus to be disposed and maintained in said first condition in which the pitch and roll attitudes of its conveying equipment are in conformity with the corresponding attitudes of the conveying equipment aboard said aircraft and the vertical height of the aircraft end of the conveying equipment on said transfer apparatus is level with the conveying equipment on said aircraft at the nose opening, second switch means operable to disable said first control means; second control means operating in response to the operation of said second switch means to cause said transfer apparatus to be disposed and maintained in said second condition in which its conveying equipment is disposed in a horizontal plane; a transfer selection switch operable to select either an aircraft loading or unloading operation for said transfer apparatus; cargo sensing means operating in response to the presence of cargo on the conveying equipment of said transfer apparatus; and third control means operating in response to the operation of said transfer selection means to select an aircraft unloading operation and the operated condition of said cargo sensing

means to cause said load carrier and said transfer apparatus to assume a relationship in which there is vertical alignment between their respective conveying equipment when its transfer apparatus is disposed in its second condition.

3,913,758
HORTICULTURE APPARATUS

Paul G. Faircloth, Apopka, and Carl R. Apthorp, III, Leesburg, both of Fla., assignors to Green Thumb Corporation, Apopka, Fla.

Filed June 15, 1973, Ser. No. 370,991
Int. Cl.² B65G *67/02*
U.S. Cl. 214—38 BB **5 Claims**



1. A greenhouse transporting system comprising in combination:

a. a cart having a frame; wheels connected to said frame for said frame to roll on; a pair of tracks in parallel spaced relationship with each other and fixedly attached to said frame; each said track having rollers thereon and at least one guide member;

b. a pallet for loading plant containers upon, said pallet having a pair of runners attached thereto in parallel spaced relationship with each other by a distance to ride upon said rollers on said cart tracks;

c. a pallet support rack having a supporting frame and having a pair of tracks in parallel spaced relationship with each other, each track having rollers thereon and at least one guide member and being spaced from said pallet runners to ride upon the rollers thereon; and

d. said cart frame having a first portion slidable on a second portion for aligning said cart roller track with said rack roller tracks; whereby a cart can have its tracks aligned with said support rack tracks and said pallets pushed from said cart to said rack and from said rack to said cart.

3,913,759
WHEELCHAIR LIFT

Scott C. Deacon, 6581 Pinion, Agoura, Calif. 91301

Filed Oct. 15, 1973, Ser. No. 406,254
Int. Cl.² B60P *1/48*
U.S. Cl. 214—77 R **9 Claims**

8. A lift mountable in a vehicle adjacent an access opening thereof, for use in moving an object such as a wheelchair to and from a generally horizontal bed of the vehicle, comprising:

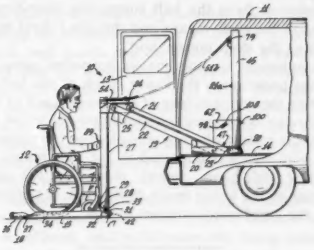
a pair of parallelogram linkages each having a base link mountable in the vehicle adjacent the access opening, two side-by-side elongated arms pivotally mounted on said base link for swinging about spaced, parallel axes between upright positions in the vehicle and outwardly extending, lowered positions, and an end link pivotally mounted on the ends of said arms opposite said base link; said linkages being spaced apart for mounting in the vehicle for swinging in substantially parallel planes;

a platform for holding the object;

two posts extending from said end links down to said platform;

a pivot connecting the lower end portion of each post to said platform adjacent a front corner thereof, for tilting of the platform about an axis disposed above, and extending along, a front edge of the platform, and holding said platform for movement of said front edge along an arc passing close to the end of the bed at the access opening, and beyond the end of the bed, into the vehicle;

means for preventing downward tilting of said platform from a generally horizontal position, but permitting upward tilting into a storage position in which the rear edge of the platform is adjacent said posts;



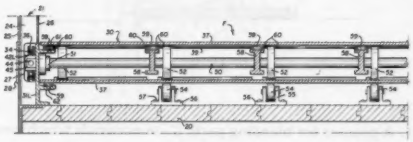
drive means for selectively swinging the linkages, in unison, to said upright position, said lowered position, and an intermediate position in which said platform is level with the bed with said front edge adjacent, but spaced from, the end thereof;

means on said platform and said linkages for tilting said platform to said storage position automatically as an incident to movement of said linkages to said upright positions, comprising at least one set of cam and follower elements including a follower on said platform adjacent said front edge, and a cam on one of said base links inside the vehicle positioned to engage said follower and cam the latter downwardly as said linkages move into said upright positions.

3,913,760
MOVABLE FLOOR FOR THE DECK OF A TRUCK

Ephraim Koral, 330 S. Forest St., Denver, Colo. 80222

Filed Aug. 23, 1973, Ser. No. 390,684
Int. Cl.² B60P *1/00*
U.S. Cl. 214—83.36 **8 Claims**



1. A movable floor adapted to be mounted upon a deck means of a truck or the like, comprising in combination:

a. a continuous flat belt spaced between forward and rearward rollers, being longitudinally flexible to move about the rollers and having a limited, lateral rigidity insufficient to support a load on its top surface without intermediate supports;

b. left side and right side longitudinal rail means upstanding and extending alongside the respective sides of the deck including bearing means at their forward and rearward ends to support the respective forward and rearward rollers with the belt being spaced between them;

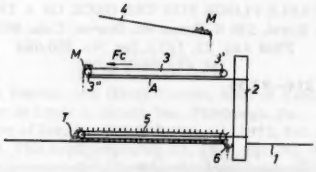
c. a drive means associated with the rollers to drive the belt;
d. a transverse intermediate support means held by the longitudinal rail means and comprising transverse shaft means at selected spacings along the longitudinal reach of the belt and between the upper and lower reaches of the belt, idle rollers mounted upon the transverse shaft means at selected transverse load supporting locations on the shafts and engaging the top surface of the bottom reach of the belt and longitudinal belt supporting slide-beam means mounted upon the transverse shaft means with each slide-beam means being alongside and adjacent to an idle roller at each shaft, and extending upwardly from the shaft to slidably engage and support the underside of the upper reach of the belt so that the load upon the belt supporting slide-beam means can be easily and directly transferred from the belt supporting slide-beam means through the shaft means and the idle rollers without deflecting the shaft means; and
e. a supplement support means supported upon the deck means underneath the lower reach of the belt and supporting the undersurface of the lower reach of the belt at a plurality of selected locations directly below the aforesaid idle rollers whereby a load upon the upper reach of the belt, which is imparted to the longitudinal belt supporting slide-beam means, thence to the rollers and thence to the lower reach of the belt, is supported upon the the supplement support means.

3,913,761

METHOD AND APPARATUS FOR HOMOGENIZING, STOCKPILING AND SAMPLING PARTICULATE MATERIALS

Raymond Louis Proner, Paris, and Réne Léon Clément Bourgoin, Fontainebleau, both of France, assignors to Societe Anonyme: Ciments LaFarge, Paris, France

Filed June 18, 1973, Ser. No. 370,739
Claims priority, application France, June 23, 1972, 72.22891
Int. Cl.² B65G *65/28*
U.S. Cl. 214—152 **19 Claims**



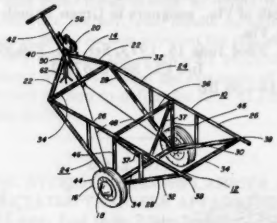
1. A process for blending particulate materials which comprises:
a. setting the particulate materials with a uniform continuous rotational movement over 36° about an axis in one direction,
b. simultaneously setting said materials with a radial movement relative to the axis,
c. heaping the materials by dropping them on a surface in at least one strip and in superposed layers, thus forming at least one toroidal mass about the axis, all radial sections of the mass by planes including the axis of rotation having a constant surface,
d. cutting radial slices in the toroidal mass, and
e. retrieving successive radial slices.

3,913,762

COMBINATION HAND AND LIFT CART

Chancey L. Alexander, 278 Lynwood Circle, Long Beach, Miss. 39560

Filed Aug. 26, 1974, Ser. No. 500,233
Int. Cl.² B62B *1/00*
U.S. Cl. 214—506 **3 Claims**



1. A combination hand and lift cart for manually lifting, lowering and carrying unitary heavy loads to and from ground and truck-bed levels and horizontally, comprising:
a. a pair of isosceles triangular trusses with equal sides and opposite acute angles, said equal sides being shorter than a longer side opposite an obtuse angle;
b. transverse frame members horizontally spacing said triangular trusses parallely apart with similar sides and angles opposing and connected at their respective angles and the respective centers of said longer sides to define a flat-topped frame body having oppositely disposed ends, one of said ends of said body frame being extended in line with said longer sides and adapted to engage the bed of a truck for loading and unloading purposes and the other of said ends being extended in line with adjacent shorter sides and brought together to define a sleeve having a free end and oppositely disposed studs fixed thereon normal to the plane of said longer sides, and a transverse frame member joining said obtuse angles defining a transverse center axis around which said flat-topped frame body is adapted to tilt;
c. a handle adapted to be slidably mounted in said sleeve for extending the length of said flat-topped frame body relative to said center axis, and hence the leverage of any force applicable to said handle for tilting said frame body around said axis;
d. axles fixed to said transverse frame member defining said transverse center axis; and
e. wheels of equal radius mounted for rotation on said axles, said radius being less than than a perpendicular dropped from either longer side to either opposite obtuse angle of one of said similar trusses, said radius, perpendicular and lengths of said truss sides being related in a ratio adapted for said one of said oppositely disposed ends of said flat-topped frame body, when tilted about said transverse center axis, to reach truck-bed level when the other of said ends is adjacent ground level.

3,913,763

COLLAPSIBLE DOLLY MOVING SYSTEM

William Smith Lee, New Orleans, La., assignor to Lee Inventions, Inc., New Orleans, La.

Division of Ser. No. 216,597, Jan. 10, 1972, Pat. No. 3,804,275, which is a continuation-in-part of Ser. No. 9,223, Feb. 6, 1970, Pat. No. 3,633,774. This application Apr. 16, 1974, Ser. No. 461,290
Int. Cl.² B60P *1/30*
U.S. Cl. 214—505 **10 Claims**

1. A collapsible dolly for transporting loads comprising:
a first, bottom platform structure;

a number of caster wheels upon which said first platform structure is mounted, said caster wheels being disposed across the bottom thereof;

a central support member mounted on said first platform structure and extending upwardly therefrom; and

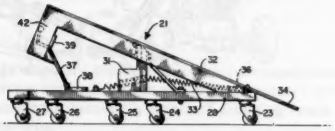
a second upper, load platform structure pivotally mounted on said central support member above and removed from said bottom platform structure;

a first end support means located on one side of said central support member for supporting one end of said upper load platform structure on said bottom platform structure; and

a second end support means located on the other side of said central support member for supporting the other end of said upper, load platform structure on said bottom platform structure; at least one of said end support means being moveably affixed to one of said platform structures allowing the end support means to be moved from an at least generally vertical, supporting disposition to a non-supporting position; whereby a load mounted on the dolly can be easily changed from an at least generally horizontal to an inclined disposition or vice versa by rotating the load platform structure about the central support.

8. The method of changing the angular disposition of a load when desired during a move, such as for example when it is desired to change the effective horizontal dimension of the load, comprising the following steps:

a. providing a collapsible dolly for transporting the load comprising:



a first, bottom platform structure;

a number of caster wheels upon which said first platform structure is mounted, said caster wheels being disposed across the bottom thereof;

a central support member mounted on said first platform structure and extending upwardly therefrom; and

a second upper, load platform structure pivotally mounted on said central support member above and removed from said bottom platform structure;

a first end support means located on one side of said central support member for supporting one end of said upper load platform structure on said bottom platform structure; and

a second end support means located on the other side of said central support member for supporting the other end of said upper, load platform structure on said bottom platform structure; at least one of said end support means being moveably affixed to one of said platform structures allowing the end support means to be moved from an at least generally vertical, supporting disposition to a non-supporting position; whereby a load mounted on the dolly can be easily changed from an at least generally horizontal to an inclined disposition or vice versa by rotating the load platform structure about the central support.

b. mounting the load on said load platform of said dolly; and

c. moving the moveably affixed end support means from one disposition or position to the other; and

d. rotating said load platform structure about said central support to thereby change the angular disposition of the load.

3,913,764

MECHANICAL HANDLING OF GOODS

James Alexander Stirling, 31 Fordwich Road, Welwyn Garden City, Herts, and Gordon Carlton, Bambergers Pallets & Cases Ltd., St. Cross St., London, both of England

Division of Ser. No. 150,011, June 4, 1971, Pat. No. 3,790,010. This application Mar. 30, 1973, Ser. No. 346,331

Int. Cl. B65g *1/14, 7/02*

U.S. Cl. 214—621 **9 Claims**

1. Apparatus for mechanically handling goods comprising a pallet having an inflatable chamber defined by a top layer upon which said goods can be placed and a bottom layer, means defining an elongated chamber opening extending along a portion of one edge of said pallet through which a separator member can be inserted into said chamber between said layers to support said goods on said top layer during the handling thereof, inflatable seal means surrounding said elongated opening for substantially sealing said opening about said member when said member is inserted therein and said seal means is inflated, said seal means being in communication with said chamber so that said seal means is inflated when said chamber is inflated, said pallet normally being substantially flat but being inflatable to receive said separator member.

3,913,765

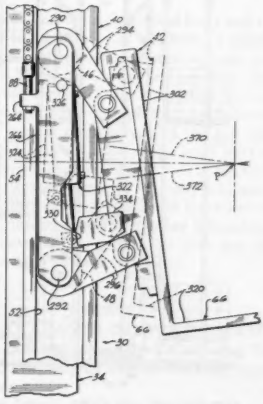
LIFT TRUCK LOAD LIFTING MECHANISM

Keith E. Ramsey, Jackson, Mich., assignor to The Knickerbocker Company, Jackson, Mich.

Division of Ser. No. 104,118, Jan. 5, 1971, Pat. No. 3,727,781, which is a continuation of Ser. No. 660,630, Aug. 15, 1967, abandoned. This application Sept. 28, 1972, Ser. No. 292,944

Int. Cl. B66f *9/16*

U.S. Cl. 214—701 P **5 Claims**



1. A mast section and carriage sub-assembly for an extensible lift truck mast including in combination a mast section comprising first and second upright rails each having a longitudinal channel, first and second tie bars disposed respectively adjacent said channels of said first and second rails and extending parallel thereto, each of said tie bars having first and second rollers rotatably carried thereon and disposed in tracking relation in the associated channel, each of said tie bars having first and second links pivotally connected to said tie bar at vertically spaced points, said links extending forwardly

of said mast section adjacent the sides of said rails in converging relationship relative to one another, apron means disposed laterally across and spaced forwardly of said rails, said apron means being carried by said links with said first and second links being pivotally connected to said apron means respectively at co-axially aligned first points and co-axially aligned second points spaced vertically from said first points, first and second hydraulic rams respectively pivotally connected at one end thereof to said first and second tie bars adjacent said first links, said apron means including first and second crank arms fixed thereto and extending toward said first and second tie bars and being pivotally connected to the opposite ends of said first and second rams respectively, and means for supplying pressure fluid to said rams to operate the same simultaneously and in synchronism with one another, each of said tie bars having a first axle mounted on said tie bar adjacent the upper end thereof, said first link and said first roller associated with each of said tie bars being journalled on said first axle, each of said tie bars having a second axle mounted on said tie bar adjacent the lower end thereof, said second link and second roller associated with each tie bar being journalled on said second axle, said rails being disposed with said channels thereof facing outwardly opposite to one another and said rams being disposed between the associated tie bar and rail in nesting relation in said channel of the associated rail for limited swinging movement within the confines of said channel.

3,913,766

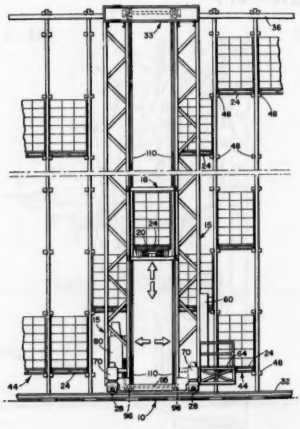
SELF LOADING AND UNLOADING VEHICLE WITH LATERALLY MOVEABLE LOAD TRANSFER MEANS

Edward A. Wentz, Gaithersburg, Md., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Division of Ser. No. 198,917, Nov. 15, 1971, Pat. No. 3,792,758, which is a continuation of Ser. No. 840,667, July 10, 1969, abandoned. This application Dec. 11, 1972, Ser. No. 314,146

Int. Cl. B66f 9/14

U.S. Cl. 214—730 **4 Claims**



1. A stacker crane comprising a horizontally movable tower having a vertically movable tray elevator and a tray carried thereby movable transversely of the direction of movement of said tower to deposit or remove pallets with respect to storage cells at one side of said tower wherein said cells have a depth in the direction of transverse motion of said tray sufficient to store two pallets; and means for effecting said transverse motion of said tray to either of two pallet handling positions with respect to said cells, said means comprising a telescopic beam structure for supporting said tray and carried by said elevator; four double acting hydraulic cylinders having respective piston rods extended outwardly of respective cylinders in neutral position; said cylinders being arranged in two pairs wherein the cylinders of each pair are integrally connected at their piston rod ends, a piston rod of each pair being connected together, a piston rod of one pair being secured to said tray elevator, a piston rod of said other pair being connected to drive said telescopic beam structure, whereby pressurizing of said latter cylinder (**365**) effects tray motion to a predetermined distance in one direction, and pressurizing the cylinder (**360**) integral with said latter cylinder (**365**) effects continued motion of said tray in the same dirction to a further predetermined distance, wherein said predetermined distance correspond to pallet positions in a storage cell.

3,913,767

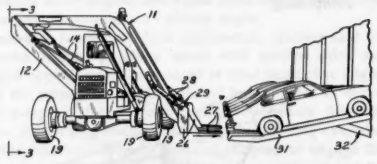
MOBILE SIDE-REACHING LIFTER

Russell F. Carriere, Baraga, Mich., assignor to Pettibone Corporation, Chicago, Ill.

Continuation of Ser. No. 148,468, June 1, 1971, abandoned. This application Mar. 6, 1974, Ser. No. 448,467

Int. Cl.² B66F 9/16

U.S. Cl. 214—770 **6 Claims**



1. A mobile reaching lifter of the class consisting of a unitary self-propelled vehicle having a single operator's cab thereon, comprising a chassis having a frame provided with front and rear wheels, a load-handling unit, reaching and raising means carried by the frame, for manipulating the load-handling unit, characterized in that:

said reaching and raising means is mounted on the frame in a manner fixed as to direction to reach outwardly in a given direction sideways and comprises an upstanding reach link pivoted at its bottom to the frame near one side thereof, reach cylinder means for operating the reach link between reaching and retracted positions leaning respectively toward and away from said direction, a boom pivoted to the upper end of the reach link and extending out sidewise from the other side of the frame, and in lowered and retracted position extending between and nearly intermediate the front and rear wheel on said other side, lift cylinder means for raising the boom and cooperating with the reach link to give the boom a reaching action at lowered and elevated positions;

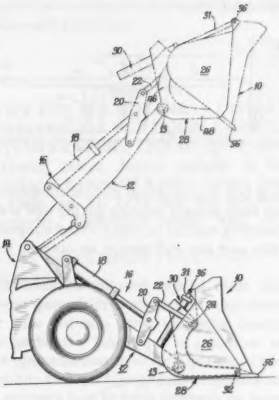
the load-handling unit being carried at the end of the boom and including projecting members extending in the direction of reach and positioned at ground level in pick-up position where the boom starts to reach in lowered position to slide the projecting members under a load and which, with the boom raised and reached, extend much farther outward than in the pick-up position; and

said operator's cab having therein a seat for the operator which, at least during operation of the reaching and raising means, faces sideways in the direction the boom extends; said cab being at times straddled by the reach link and having a doorway opening sidewise of the vehicle through the reach link.

3,913,768
LARGE CAPACITY BUCKET WITH HIGH-DUMPING CAPABILITY

Frank August Grooss, Morton, Ill., and Rudolf Wagner, Surrey, Canada, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 20, 1974, Ser. No. 453,183
Int. Cl.² E02F *3/28*
U.S. Cl. 214—774 **9 Claims**



1. A large capacity bucket structure for attachment to standard tractor loader lift arms and attitude control linkage while maintaining substantially standard dumping reach and height, comprising:

a bucket support cradle having a pair of generally L-shaped upright arms and rigid bridging connecting upper arm portions with lower arm portions cantilevered forwardly, a large capacity open-mouth bucket having a cutting lip and pivot means immediately behind the lip, said lower arms having means to pivotally connect the bucket to the arms at said pivot means,

a dumping cylinder motor trunnioned in said bridging and operatively pivoted to the upper portion of the bucket for rotating the bucket about said pivot means and out of the cradle for material dumping,

said cradle arms having conventionally spaced pivot connections for attachment of the loader lift arms and attitude control linkage thereto providing for motion of the cradle and bucket as a unit by the tractor loader.

3,913,769
SAFETY LOCKING CAP

Joseph Scrocco, West Orange, and Hugh Cottingham, Orange, both of N.J., assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 20, 1974, Ser. No. 535,057
Int. Cl.² A61J *1/00*; B65D *55/02*
U.S. Cl. 215—206 **10 Claims**

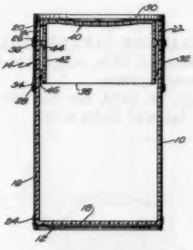
1. A safety locking cap assembly comprising in combination a circular bottle neck adapted to rotatably receive a cap, said bottle neck including a radial projection, a cap including an axially directed lug adapted to be positioned in interfering engagement with said radial projection by rotation of said cap in a first direction into closing engagement with said bottle neck, thereby preventing rotation of said cap in the other rotational direction, and an axially directed finger rotatably disposed with respect to said cap and bottle neck and adapted to cam said lug out of interfering engagement with said radial projection in response to radial alignment between said lug and said finger to thereby permit removal of the cap from said

bottle neck by rotation of same in the other rotational direction.

3,913,770
DRINKING CONTAINER

Richard E. Tarro, 425 Broadway, Providence, R.I. 02903

Filed Sept. 7, 1973, Ser. No. 394,992
Int. Cl.² B65D *55/02*; A47G *19/22*
U.S. Cl. 215—223 **8 Claims**



1. A beverage can having a cylindrical body and an annular bottom crimped to the bottom of said body, a plastic liner in said can having a bottom and a cylindrical body portion extending vertically above the edge of said can body, and a cover for said can having a cylindrical body portion and an annular top crimped to said body portion, said can body having spaced non-continuous sets of threads, one at the top edge and a second set spaced below it, said cover body portion having spaced non-continuous sets of threads, one at the bottom edge and a second set spaced above it, whereby said non-continuous sets of cover threads will engage said spaced non-continuous sets of body threads when said cover is mounted on said can body, said cover top engaging said liner top edge when said cover is mounted on said can body.

3,913,771
CLOSURE CAP WITH TAMPER INDICATOR

Daniel D. Acton, Lancaster, and Carl E. Koontz, Thornville, both of Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed June 1, 1973, Ser. No. 366,093
Int. Cl.² B65D *43/02*
U.S. Cl. 215—256 **22 Claims**

1. A tamperproof press-on and lift-off closure for sealing a container having a closure engaging bead at its rim comprising the combination of:

a molded annular plastic resin skirt;

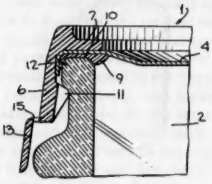
a cover;

said skirt having an upper portion mounting the cover at a top portion of the skirt;

container engaging means on a radial inner portion of said upper portion of the skirt positioned below said cover and

extending radially inwardly of the outer edge of said cover for engaging a container bead providing a snap fit;

a circular downwardly facing pry-off lower edge on the bottom of said upper portion of said skirt for use in pressing said closure upwardly and off of said container;



an annular tamper indicating band attached to said upper portion of said skirt by an integral molded frangible connection; and

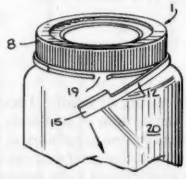
said band being positioned radially outwardly of and extending downwardly from the said lower edge thereby preventing access thereto when said closure is on a container.

3,913,772

TAMPERPROOF CLOSURE CAP AND SEALED PACKAGE

Charles S. Ochs, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Sept. 14, 1973, Ser. No. 397,439
Int. Cl.² B65D *43/02*
U.S. Cl. 215—256 **6 Claims**



1. An improved sealed tamperproof package comprising the combination of:

a glass container;

said container having closure engaging threads adjacent its rim;

an annular transfer bead extending outwardly from the upper portion of the container below said cap engaging threads and having a smooth surface and being positioned below said container threads for engaging all of the cap pawls as the cap is turned onto the container and prior to any pawl engaging one of said container lugs;

a plurality of spaced pawl engaging lugs positioned on the container immediately adjacent to said smooth surface;

a composite closure cap positioned on said container comprising the combination of:

a plastic ring having an annular cover portion and a depending skirt;

a metal cap cover;

means on the skirt of said plastic ring engaging the outer edge of said cap cover and for permitting relative rotation between the ring and the cover;

container engaging threads formed on the inner surface of said ring;

a tear-off band formed integrally with and extending downwardly from the lower edge of said skirt and being connected thereto by a frangible connection; and

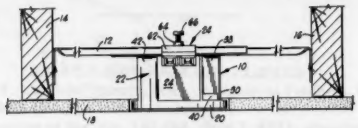
a plurality of lug engaging resilient pawls formed on said band and projecting inwardly thereof for engaging said lugs on the container.

3,913,773

CEILING BOX FOR ELECTRICAL OUTLETS

Donald G. Copp, Mantua; James C. Ellsworth, Kent, both of Ohio, and Charles E. Mosher, New Rochelle, N.Y., assignors to Indian Head, Inc., New York, N.Y.

Filed Aug. 28, 1972, Ser. No. 284,177
Int. Cl.² H02G *3/08*
U.S. Cl. 220—3.92 **6 Claims**



1. A ceiling box for electrical outlets comprising:

a synthetic resin unitary housing having side walls and a top wall extending normal to, and formed integrally with, said side walls, said top wall having an opening therethrough; and

a synthetic resin hanger bracket of generally U-shaped cross-sectional configuration projecting upwardly from, and formed integrally with, said top wall, said hanger bracket including a top panel extending substantially parallel to said top wall over said opening, and a pair of leg panels interconnecting said top wall and top panel and positioned on opposite sides of said opening, said hanger bracket defining a passageway extending substantially parallel to said top wall; and

a closure plate positioned in, and closing, the opening in said top wall.

5. In a synthetic resin ceiling box for electrical outlets, the improvement comprising a hanger bracket formed integrally with a wall of said ceiling box and including:

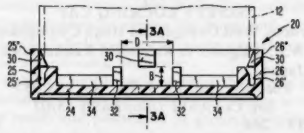
a top panel extending substantially parallel to said wall; and a pair of leg panels connecting said top panel to said wall and defining with said top panel, an elongated, open-ended channel through said hanger bracket, each of said leg panels having offset portions therein adjacent said wall for receiving and engaging a ribbed closure plate adapted to close an aperture in said wall directly under the top panel of said hanger bracket.

3,913,774

END CAPS FOR CONTAINERS

Leslie Vajtay, 107 Stanford Ave., Colonia, N.J. 07067

Filed Mar. 12, 1973, Ser. No. 340,400
Int. Cl.² B65D *7/00*
U.S. Cl. 220—4 R **19 Claims**



1. A container having a tubular central section forming a plurality of sides and at least one rigid end cap, said at least one end cap positively engaging at least one of said plurality of sides, the combination comprising:

at least one perforation in said at least one of said plurality of sides;

said rigid end cap having a base and a plurality of rigid flanges of the same number as said plurality of sides, said

flanges being contiguous with at least a portion of said sides; and

at least one substantially rigid engaging means integral with said rigid end cap, said engaging means having at least two fixedly spaced apart portions, a first portion forming a first camming surface for flexing said at least one of said plurality of sides in a first direction and also forming a protrusion engaging said at least one perforation, said second portion forming an opposed camming surface for flexing said at least one side in an opposite direction and also forming a retaining surface integral with said rigid end cap for preventing the disengagement of said perforation from said protrusion.

3,913,775

DEVICE FOR HOLDING HEAT INSULATING MATERIALS FOR DOUBLE-SHELL LOW-TEMPERATURE LIQUID STORAGE TANK

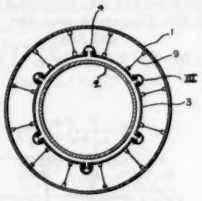
Masahiko Ozaki, Tokyo, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 21, 1974, Ser. No. 435,216

Claims priority, application Japan, Aug. 30, 1973, 48-101830

Int. Cl.² B65D *25/18, 87/24*

U.S. Cl. 220—9 LG **2 Claims**



1. A heat-insulated liquid storage tank comprising a bottom, a cylindrical one-piece outer shell, a cylindrical one-piece inner shell spaced therefrom, a roof for said outer shell, a roof for said inner shell and a series of arcuate one-piece segments disposed between said inner shell and said outer shell to form a cylindrical intermediate wall, the edge of each of said segments being provided with vertically extending integral flanges, adjacent flanges of each segment being spaced from each other, an expansable joint connecting adjacent flanges to permit expansion and contraction of said intermediate wall, means for connecting the intermediate wall to the inner surface of the outer shell and disposed in the space between said intermediate wall and said outer shell to provide support for said intermediate wall, and insulating material disposed in the space between said intermediate shell and said outer wall.

3,913,776

VACUUM-INSULATED VESSEL

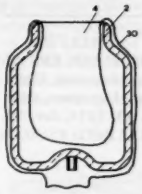
Donald Harry Tantam, London, England, assignor to The British Oxygen Company Limited, London, England

Filed Mar. 23, 1973, Ser. No. 344,267

Int. Cl.² A47J *41/02*; **B65D** *23/02, 23/08*

U.S. Cl. 220—9 C **11 Claims**

1. A vacuum-insulated vessel comprising an insulating shell at least partially air-permeable and having as an interior and exterior lining a one-piece layer of impermeable flexible material sealed about the shell, said flexible material defining a closed chamber containing said shell and within which a vacuum is drawn through said shell, said shell comprising a rigid



layer of plastic material having inner and outer surfaces and a layer of porous material covering one of said surfaces.

3,913,777

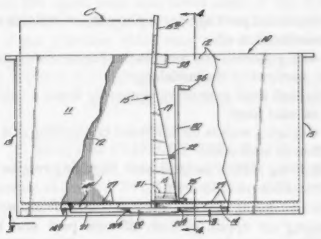
CARD TRAY

Alfred R. Schoenly, Warminster, Pa., assignor to Scriptomatic, Inc., Philadelphia, Pa.

Continuation-in-part of Ser. No. 126,540, March 22, 1971, abandoned. This application Jan. 4, 1973, Ser. No. 320,920

Int. Cl. B65d *1/24, 1/26*

U.S. Cl. 220—22.3 **3 Claims**



1. A portable card tray, comprising: a container having upstanding side walls and front and rear end walls defining an enclosure and having bottom wall segments spaced upwardly from the lower edges of the side and end walls and extending inwardly from the side walls toward each other to define therebetween a slot extending longitudinally of the container; a card follower carried in said container for engaging cards at selected locations therein, said card follower having shoulder means on its lower portion spaced above the upper side of said bottom wall segments and flange means spaced from said shoulder means disposed in engagement with the underside of said bottom wall segments, a series of teeth formed on the upper side of each said bottom wall segments spaced inwardly from the side walls with each tooth in said series having a surface inclining toward said card follower, a catch member carried by said card follower, said catch member including an arm extending rearwardly of said card follower, outer side edge portions of said arm engaging against the upper surface of said bottom wall segments outwardly of said series of teeth to support said card follower in said container and maintain said flange means in engagement with the under side of said bottom wall segments, said arm having between said outer side edges, a depending terminus shaped to engage between adjacent teeth in said series with said terminus having an inclined surface to mate with the inclined surfaces on said series of teeth, an upstanding lever on said catch member arm positioned forwardly of said terminus and projecting upwardly in spaced relation with said card follower, a first flexible web extending generally parallel to the bottom wall interconnecting the lower edge of said card follower with the lower end of said lever, and a second flexible web extending between and interconnected with said card follower and said lever above said first flexible web, said first and second flexible webs

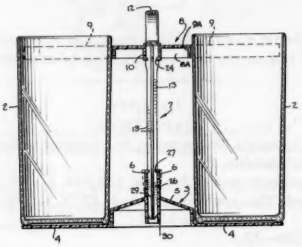
resiliently urging said catch member arm terminus into engagement with said teeth and the outer edge portions of said arm into engagement with said bottom wall segments.

3,913,778

PACKAGE FOR TUMBLERS AND THE LIKE

Richard K. Oglesbee, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Sept. 13, 1974, Ser. No. 505,643
Int. Cl.² B65D *85/30, 21/02*
U.S. Cl. 220—23.83 **10 Claims**



1. An improved package for a plurality of articles comprising the combination of:

a base with a plurality of receptacles for receiving the lowermost portions of the articles;

an elongated post extending upwardly from a central portion of said base;

a base engaging means on said post comprising one or more notches in said post;

a resilient lug means on said base engaging one or more of said notches on said post;

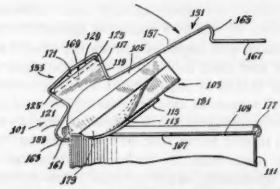
a cover including an aperture at its central portion for engaging an upper portion of said post and having a plurality of article engaging grips positioned on and directed outwardly from the central portion of said cover for releasably engaging upper portions of the articles; and the number of said grips corresponding to the number of said article receptacles in said base and one clip being positioned above each receptacle.

3,913,779

CAN CLOSURE DEVICE

Sidney J. Blazer, 19 Edward Ave., Old Bridge, N.J. 08857, and Mark C. Jacobs, 4807 Marlborough Way, Carmichael, Calif. 95608

Continuation-in-part of Ser. No. 142,972, May 13, 1971, abandoned. This application Apr. 2, 1973 Ser. No. 346,989
Int. Cl. B65d *45/18*
U.S. Cl. 220—243 **7 Claims**



2. A reusable can closure device particularly adapted for use in sealing openings found in the top of a cylindrical can, which can has a cylindrical side wall and a circular rim, said closure comprising:

a. a resilient deformable plug having a generally teardrop shape and including a main body portion sized larger than the opening area of the can top, and a neck portion extending upward from the main body portion, the neck portion having a top surface and upwardly tapered back and front walls, the main body portion having a bottom side, and a generally teardrop shaped platform;

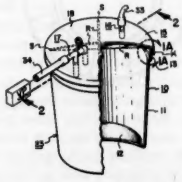
b. an elongated resilient spring clip adapted to be removably hooked onto the can rim at one end and clamped onto the rim at the other end, said clip being a one piece metallic member, the intermediate section thereof being shaped to form a dovetail slot for receiving and holding in tight fitting relationship the neck of the plug, the dovetail slot including upwardly tapered front and back walls coreacting with said neck portion of the plug, and a top wall cooperating with the top surface of the neck portion of the plug to prevent sidewise movement of the plug relative to the clip, and having a front section sloping downwardly with the horizontal, and a reverse curved portion forming a clamp and then terminating in downward and outward extending finger grasping tip, and the rear section terminating in a downward and outward curve portion forming a hook, the clamp being lower than the hook.

3,913,780

VACUUM-OPERATED FLUID BOTTLE AND SYSTEM

Legrand K. Holbrook, and David S. Ostler, both of Salt Lake City, Utah, assignors to Medical Development Corporation, Salt Lake City, Utah

Division of Ser. No. 187,275, Oct. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 876,438, Nov. 13, 1969, Pat. No. 3,620,408. This application Oct. 2, 1973, Ser. No. 402,801
Int. Cl.² B65D *35/44, 43/00*
U.S. Cl. 220—200 **1 Claim**



1. In a vacuum-fill bottle having a container and a cover secured thereto, said container having vacuum port means and fluid inlet port means; an improvement wherein said cover is dome-shaped, convex upwardly, and is provided with transverse centrally intersecting support ribs on its underneath side, said container and cover being provided with inter-engaging securement means constructed for optimum effectiveness when vacuum is applied to the interior of said bottle via said vacuum port means, the outer extremities of said support ribs being spaced from said securement means, whereby to permit said cover to deflect downwardly about the said outer extremities of said support ribs and thereby permit said inter-engaging securement means to seal.

3,913,781

EXPANSION TANKS OF COOLING SYSTEMS

Bernard Andreux, Rueil-Malmaison, France, assignor to Regie Nationale Des Usines Renault, Billancourt, France

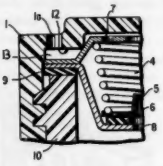
Filed Oct. 4, 1974, Ser. No. 512,222
Claims priority, application France, Oct. 5, 1973, 73.35686
Int. Cl.² B65D *51/16*
U.S. Cl. 220—203 **3 Claims**

1. An expansion tank for a cooling system comprising:

a plastic tank body having an externally threaded neck portion;

a plastic cap having an internally threaded portion and being adapted to be threadably engaged upon said neck portion of said tank body;

a metallic pressure vacuum valve capsule having means thereon for seating upon the edge of said neck portion for supporting said capsule in said tank body;



means on the inner portion of said cap for engaging said capsule upon threadably tightening said cap on said tank body for causing said capsule to serve as a seal between the tank and the cap simply by screwing said cap thereon; and

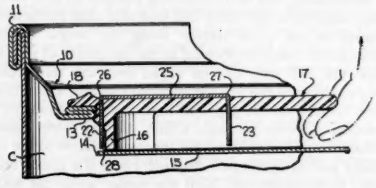
said cap having holes from the exterior opening into air passage gaps at the level of said seal, said gaps having a slope of inclined separation in the same sense as the cap threads.

3,913,782

RESEALABLE SELF-OPENING END UNIT

Ann Elisabeth Cass, Justice, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,889
Int. Cl.² B65D *41/02*
U.S. Cl. 220—260 **10 Claims**



1. An easy opening end unit comprising an end panel, a weakening line in said end panel defining a tear out portion at least partially removable therefrom, an arcuate member inboard of said weakening line and being secured to said tear out portion, and means carried by said arcuate member aligned with a portion of said weakening line for rupturing the latter upon the application of a downwardly directed force against said rupturing means in a direction toward said end panel.

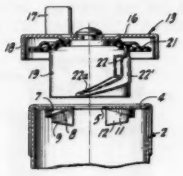
3,913,783

SAFETY CLOSURE CAP WITH RETAINING FEET

Alfred Cooper, 1381 Via La Paloma, San Lorenzo, Calif. 94580

Filed Jan. 17, 1974, Ser. No. 434,053
Int. Cl.³ B65D *41/06*
U.S. Cl. 220—300 **11 Claims**

3. A safety closure cap for connection with a filler spout of an automobile tank or the like comprising a top, said spout having an open filling end surrounded by a rim, a spring pressed sealing disc structure secured to the underside of the top to seal against said rim, the spout having adjacent said rim opposite cam surfaces which are separated by opposite entry notches, opposite latching lugs on the cap insertable through the notches which upon turning the cap in one direction latch the cap against said rim of the spout by the lugs riding over the cam surfaces, prongs extending downwardly from the respective latching lugs to insure proper seating of the cap on said rim of the spout, and an arcuate downwardly inclined retaining foot extending circumferentially about the axis of the cap from the lower end of each prong and having its lower end spaced from the prong, said retaining feet extending in the same circumferential direction to form a screw and being insertable with the associated prongs through the entry



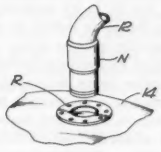
notches upon turning of the cap in said one direction to latch the same; and upon turning of the cap in an opposite direction to unlatch the same, said feet being engageable with said cam surfaces upon axial displacement of the cap to retain the cap loosely on the spout until said lower ends of the feet are removed manually through the entry notches to thus allow venting of gas pressure which may have built up in the tank and thus prevent such gas pressure from blowing the cap away from the spout as it is being unlatched.

3,913,784

SEALING CLOSURE APPARATUS

David B. Ayres, 4633 W. M-12, Quartz Hill, Calif. 93534

Continuation of Ser. No. 291,449, Sept. 22, 1972, abandoned. This application May 15, 1974, Ser. No. 470,253
Int. Cl.² B65D *43/20*
U.S. Cl. 220—348 **10 Claims**



1. A closure structure for a receptacle, as in a fluid tank, comprising:

a closure member to be received to close said receptacle;

plural pairs of first and second arms, interconnected at a pivot junction for relative pivotal motion;

means for connecting each of said first arms to said receptacle at spaced-apart locations removed from said pivot junction;

means for coupling each of said second arms to said closure member at spaced-aparat locations removed from said pivot junction;

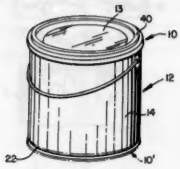
guide means for said closure member, to limit movement thereof in relation to said first member to a single direction whereby to vary the angular relationship between said first and second arms at said pivot junction; and

spring means for exerting a force directly between said pairs of arms to provide a position biasing force for moving said closure member into closing relationship with said receptacle.

3,913,785
SEALING GROOVE COVER FOR PAINT CONTAINER OR THE LIKE

Howard F. Pattershall, 21 Fuller Road, Augusta, Maine 04330

Filed May 24, 1973, Ser. No. 363,751
Int. Cl.² B65D 25/20, 21/02
U.S. Cl. 220—354 5 Claims

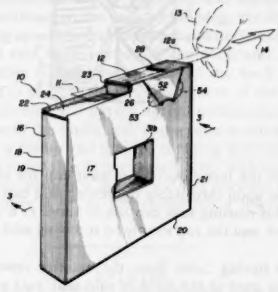


1. A sealing groove cover for a resealable container for paint or like material, the container having an opening in at its upper end and a releasably retained press-on lid providing a closure for the opening and including a generally cylindrical side wall and upper and lower chimes respectively encircling the upper and lower ends of the side wall, a generally radially disposed lower end wall, and an annular lid retaining flange fixed to and extending generally radially inwardly from the upper end portion of the side wall, the retaining flange having a coaxial upwardly opening annular sealing groove encircling the opening for receiving an annular sealing rib on the lid in press-fit engagement therein, the retaining flange further including a coaxial annular bead disposed radially inwardly of the sealing groove and having an inner periphery defining the circular opening, the lid in its retained position cooperating with the retaining flange to define an upper end wall of the container, said sealing groove cover comprising a unitary endless annular band of resilient flexible material for attachment to the container in an active position when the lid is removed therefrom and in an inactive position when the lid is in its retained position, said band having a substantially uniform generally L-shaped cross-sectional configuration and including a generally cylindrical retaining wall portion for encircling the upper chime in gripping engagement in said active position and for encircling one of the chimes in gripping engagement in said inactive position, said band including a coaxial annular cover flange portion extending generally radially inwardly from said retaining wall portion and having a generally radially disposed axially outwardly facing annular outer surface terminaling at a sharp circular inner peripheral edge having a diameter not smaller than the diameter of the circular opening defined by the inner periphery of the bead when the cover is in said active position, said cover flange portion having an endless generally concave annular surface opening generally radially inwardly and forming a junction with said outer surface at said sharp circular inner peripheral edge, said concave annular surface complementing an associated portion of the bead for sealing engagement therewith in said active position, said cover flange portion in said active position being disposed above the sealing groove, said concave annular surface being biased into sealing engagement with the bead, said cover flange portion in said inactive position overlying an associated portion of one end wall of the container.

3,913,786
DISPENSING CARTON FOR ATTACHABLE PACKAGE HANDLES

Raymond H. Kartasuk, Lincolnwood, Ill., assignor to Wilton Corporation, Des Plaines, Ill.

Filed Apr. 11, 1974, Ser. No. 459,941
Int. Cl.² B65H 5/28
U.S. Cl. 221—70 5 Claims

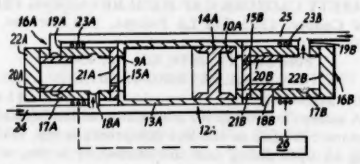


1. A dispensing carton for articles wound on a spool and carried by a pull-out strip, comprising in combination: side wall support members, hub means secured to said side wall support members to receive the spool of the wound articles, a top wall positioned over the spool of wound articles, an outlet formed intermediate said top wall through which the articles are dispensed together with their pull strip, a ramp portion extending from said outlet upwardly toward the terminating end of the carton, said ramp having parallel side edge portions progressively decreasing in height from said outlet to said terminating end and extending parallel to said side wall support members, said ramp and said side edge portions being U-shaped in the cross section along the length thereof, a reinforcement member formed at the periphery of said outlet so that the pull strip can be urged over the reinforcement during ejecting of the articles secured thereto, and a channel section formed on the top wall immediately behind the reinforcement member through which the pull strip passes to maintain the pull strip in a fixed location relative to the outlet, whereby pulling of the pull strip will cause the article secured thereto to be dispensed from the outlet while the spool of articles is turned about said hub.

3,913,787
METERING SYSTEM AND CONTROL THEREFOR

Lawrence Dilger, 46, Ridge Langley, South Croydon, Surrey, England

Filed Dec. 23, 1971, Ser. No. 211,464
Claims priority, application United Kingdom, Nov. 23, 1971, 1454/71; Jan. 12, 1971, 1454/71
Int. Cl.² B67D 5/18
U.S. Cl. 222—26 17 Claims



1. A fluid metering system comprising fluid supply means arranged to supply under pressure fluid to be metered, a fluid

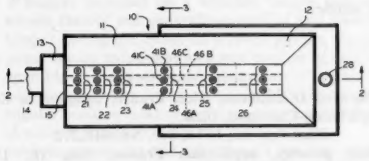
outlet line for metered fluid, a dispensing system having at least one displacement assembly including a chamber and a displaceable member dividing the chamber and movable therein under the influence of the pressure of said fluid to perform dispensing strokes and a valve system by which the parts of the chamber on each side of the displaceable member are connectable to said fluid supply means and to said outlet line for metered fluid, indicating means for indicating the volume of fluid dispensed and a common controller operable electrically to control said valve system to cause said displaceable member to execute complete dispensing strokes and to provide data derived independently of the dispensing strokes directly to the indicating means whereby the indicating means indicates the quantity of fluid metered to said outlet line.

3,913,788

AUTOMATED CONTINUOUS CLASSIFICATION AND REBLENDING SYSTEM FOR SAND AND OTHER GRANULAR MATERIAL

Porter Thompson McCauley, Winnetka, Ill., assignor to Eagle Iron Works, Des Moines, Iowa

Filed Dec. 18, 1974, Ser. No. 533,802
Int. Cl.² B67D *5/08*
U.S. Cl. 222—64 **10 Claims**



1. A control system for a water scalping tank or like apparatus for classifying and reblending granular material in accordance with a quantitative ratio specification, of the kind including a master classification station and a series of secondary classification stations at which different classes of material accumulate at varying rates, each station including a sensor for developing a discharge signal indicative of the presence of sufficient accumulated material to allow discharge at a relatively constant rate for a minimum time interval, each station further including discharge means actuatable between a closed condition in which no material is discharged from the station, a normal discharge condition in which material is discharged to a specification reblending receptacle, and an auxiliary discharge condition in which material is discharged to an auxiliary receptacle, the control system comprising:

a plurality of actuating means, one for each classification station, for actuating the discharge means for that station from its closed condition to a discharge condition in response to a discharge signal from the sensor for that station, and further for actuating the discharge means to its auxiliary discharge condition in response to a diversion signal;

a plurality of timing means, one for each classification station, for generating a timing signal representative of the time that classification station is in its normal discharge condition;

a series of comparator means, each including a settable ratio control, one comparator for each secondary classification station, for continuously comparing the master station timing signal in pre-set ratio with the secondary station timing signal to develop an excess signal whenever there is an excessive discharge from that secondary station to the specification receptacle and to develop a deficiency signal whenever there is an inadequate discharge from that secondary station to the specification receptacle, the excess signal from each secondary station being applied to the actuating means for that station as a diversion signal;

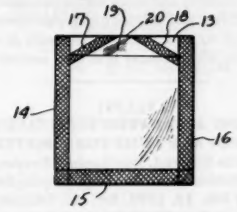
and means, coupled to all of the comparator means, for applying a diversion signal to the actuating means of the master station upon occurrence of a deficiency signal from any of the comparators.

3,913,789

FLUID CONTAINER OF THE FLEXIBLE WALL CAPSULE TYPE

Hobson F. Miller, New York, N.Y., assignor to United States Banknote Corporation, New York, N.Y.

Filed Feb. 13, 1974, Ser. No. 441,995
Int. Cl.² B65D *77/38*; B67D *3/00*
U.S. Cl. 222—107 **3 Claims**



1. A flexible wall capsule comprising two layers of sheet material of similar size and rectangular shape which form two opposed walls of a rectangular capsule, which said layers are sealed together along marginal areas extending around the entire periphery of the capsule to provide a space between the unsealed areas of the walls, the marginal areas of three sides of said rectangular capsule being more strongly sealed than the marginal areas of the fourth side, the marginal areas of said fourth side being modified by the provision of two strengthened sealed areas having edges extending diagonally in opposite directions across the less strongly sealed marginal areas of said fourth side from the two adjoining more strongly sealed marginal areas and terminating at the free edge of said fourth side, said diagonally extending edges of said strengthened sealed areas being spaced apart at the said free edge of said fourth side to leave a weakly sealed area of limited predetermined size at a predetermined location between said diagonally extending areas where, when pressure is applied to the unsealed areas of the walls of the capsule, the seal may be broken between said layers only within said limited area to provide an opening of limited predetermined size at the free edge of the capsule to meter the flow of material from said space

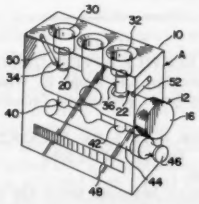
---

3,913,790

MEDICAL TESTING DEVICE

Nancy Anne Seidel, 20 Mitchell Lane, Chagrin Falls, Ohio 44022

Filed Aug. 23, 1974, Ser. No. 500,158
Int. Cl.² B67D *5/60*
U.S. Cl. 222—132 **7 Claims**



1. A medical testing device for mixing first and second liquids in a testing chamber, said device comprising: a housing

having an outer surface and a visable testing chamber; first and second liquid inlet passageways in said housing intersecting said outer surface and adapted to receive unmeasured quantities of said first and second liquids, respectively; each of said first and second inlet passageways having a lower outlet and; a transfer element having two cavities with calibrated volumes; means for moving said transfer element in said housing between a first position with one of said cavities aligned with and in communication with each of said outlet ends and a second position with said cavities aligned with said chamber whereby measured volumes of said liquids in said cavities are deposited into said chamber for mixing and testing; first and second air vent passageways extending in said housing from said outer surface; and, third and fourth air vent passageways in said transfer element and each communicated with one of said cavities, said first and third air vent passageways and said second and fourth air vent passageways being in communication when said transfer element is in said second position.

3,913,791

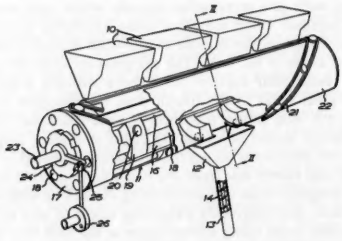
CONVEYING APPARATUS, ESPECIALLY FOR GRANULAR AND LUMP FORM MATERIAL

Soren Elof Mauritz Sollerud, Norrkoping, Sweden, assignor to Svenska Chokladfabriks Aktiebolaget, Ljungsbro, Sweden

Filed Feb. 19, 1974, Ser. No. 443,666

Int. Cl.² B67D 5/56

U.S. Cl. 222—139 **7 Claims**



7. Apparatus for conveying material from a plurality of dosing units to a receiving means in a bag-filling machine, said apparatus comprising drum means mounted for rotation about its longitudinal axis, a plurality of outwardly open compartments disposed in side by side relation around said drum means and extending longitudinally thereof means rotating said drum means about said axis to move said compartments successively passed a material receiving station extending beneath all of said dosing units and a discharge station extending above a material receiving means, means closing said compartments during rotation thereof from said material receiving station to said discharge station, and a material conveying means in each said compartment operable to convey material in the compartment to a predetermined location therein during movement thereof from said receiving station to said discharge station.

3,913,792

DOUBLE SERVICE BEVERAGE TOWER

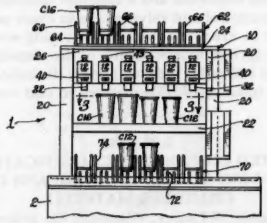
Frank D. Brill, Norridge, and Ralph E. Weimer, Lombard, both of Ill., assignors to Restaurant Technology, Inc., Oak Brook, Ill.

Filed Jan. 8, 1975, Ser. No. 539,271

Int. Cl.² B67D 5/60

U.S. Cl. 222—144.5 **9 Claims**

1. A double service beverage tower for filling beverage containers from a single beverage faucet from each of the front and back of said tower, comprising: a tower support having a front, a back and two sides, a plurality of adjacent beverage faucets forming a single row of faucets extending between said sides for dispensing a plurality of beverages, each faucet providing only a single discharge nozzle, said discharge nozzles being spaced apart laterally and forming a single row between said sides, means on said support for guiding beverage containers from said front and from said back into positions beneath each of said nozzles and, for each



said faucet, manually operable control means at the front of said tower and separate manually operable control means at the back of said tower for actuating said faucet so that said beverage containers may be independently filled by operators from the back and from the front of said tower through said faucet nozzle.

3,913,793

LIQUID DISPENSER

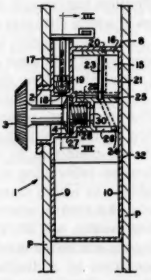
Jean-Bernard D'Assuncao, Nice, France, assignor to Eaton Corporation, Cleveland, Ohio

Filed Feb. 19, 1974, Ser. No. 443,275

Claims priority, application France, Feb. 16, 1973, 73.305525

Int. Cl.² B67D 5/64

U.S. Cl. 222—165 **8 Claims**



1. A device for setting apart and emptying a dose of a liquid in a container comprising:

a door pivoting from a position of setting apart to a position of emptying with said door having an external opening;

a tank located in said door;

a pipe having a stopper placing said external opening into communication with said tank;

a chamber located in the door and placed above said pipe in the emptying position;

a chamber opening in the lower part of said chamber for the emptying position and for placing said chamber in fluid communication with said pipe;

a closing device displaceable from a sealing position of said chamber opening to a position of releasing the chamber opening;

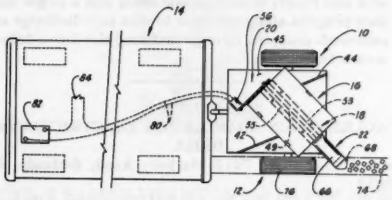
a plunger located in said chamber for varying the useful volume of said chamber; and

a control member for controlling the position of said plunger, said control member extending into said pipe so as to be accessible through said external opening.

3,913,794
AMBULANT FEED DISPENSER HAVING ANGULARLY DISPOSED AUGER

Frank L. Dale, 210 N. Philadelphia, Coldwater, Kans. 67029

Filed Oct. 29, 1973, Ser. No. 410,545
Int. Cl.² B67D 5/30
U.S. Cl. 222—178 3 Claims

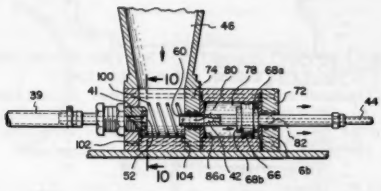


1. A feed dispenser means, comprising:
a. a hopper mounted on a wheeled vehicle between the wheels thereof and generally central of said wheels, said hopper having the outlet on a lower portion thereof,
b. auger means mounted in a lower portion of said hopper operable to move material when therein to said outlet, said auger means being mounted in a transverse and angular position relative to the normal forward direction of motion of said vehicle,
c. powering means for said auger means operably connected to said auger means, and
d. discharge conduit means having the inlet thereof mounted in communication with said hopper outlet and having the outlet opening in proximity to the rear of a wheel to one side of said vehicle, to in operation discharge material into a track of said wheeled vehicle at the rear of said vehicle, said hopper has tapered sidewalls in said lower portion adjacent to said auger means, said discharge conduit has a rigid conduit portion secured to said hopper outlet and a flexible conduit end portion secured to said rigid portion, said flexible conduit portion terminating in close proximity to ground level to in use discharge feed material in close proximity to ground level into a track of said wheeled vehicle, said auger means has a shaft rotatably mounted in said lower portion of said hopper with spiral flighting secured on said shaft, said powering means has a motor mounted on said wheeled vehicle and rotatably connected with said shaft, said hopper is generally rounded in cross-section in its bottom portion and has upwardly extending divergent sidewalls having said auger means extending longitudinally therethrough in said bottom thereof between said sidewalls, said hopper has end walls secured to said sidewalls on opposite ends thereof, said outlet being through one of said end walls, said flexible conduit end portion has a conduit closure means to close said flexible conduit end portion when said feed dispenser means is not in use, said rigid conduit portion extends from said hopper outlet in line with said auger means to a point generally vertically disposed above a track of said vehicle when in use, said flexible conduit end portion extends generally vertically downward from said rigid conduit portion and additionally including a shield member having a structure defined generally as in inverted V, said shield member being situated above said auger means to guide material correctly into same for movement, fastener means attached to the ends of said shield member, said V-shaped member being vertically adjustably attached on its ends by said fastener means to said hopper end walls.

3,913,795
PULSATING POWDER METERING AND DISPENSING DEVICE

Robert G. Coucher, Salt Lake City, and Edward Taylor, Hunter, both of Utah, assignors to EPPCO, Salt Lake City, Utah

Filed July 29, 1974, Ser. No. 492,498
Int. Cl.² B67D 5/54
U.S. Cl. 222—194 25 Claims

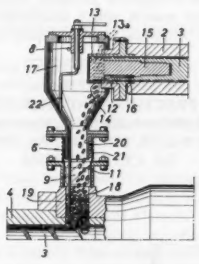


1. A powder metering and dispensing device comprising:
a powder reservoir having a normally constricted openable outlet;
an open ended metering chamber mounted for movement within said powder reservoir;
means for moving said metering chamber through said powder reservoir and into registry with said normally constricted openable outlet; and
means for introducing a pulse of pressurized fluid into said metering chamber, said pressurized fluid having a pressure sufficient to open said normally constricted openable outlet and to permit passage of said fluid therethrough.

3,913,796
VENT-TYPE INJECTION MOLDING MACHINE

Katashi Aoki, Sakaki, Japan, assignor to Nissei Plastics Industrial Co., Ltd., Japan

Filed Oct. 31, 1973, Ser. No. 411,431
Claims priority, application Japan, Nov. 6, 1972, 47-127874
Int. Cl.² B29F 1/00, 3/06
U.S. Cl. 222—238 1 Claim

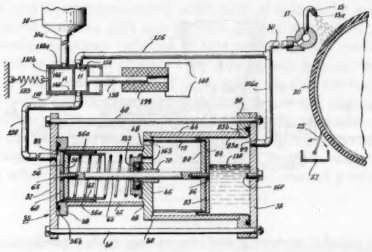


1. A vent-type injection molding machine which comprises:
a preheating cyclinder having an extrusion screw therein for heating resin material to a semi-molten condition;
an injection cylinder having an injection screw therein for injecting the resin material into a mold;
a supply tube connecting the downstream end of said preheating cylinder and the upstream portion of said injection cylinder and is characterized in that said supply tube is provided with a vent and sight holes wherein said extrusion screw is provided with a head having a plurality of depressions, and said preheating cylinder is provided with a bush member having an aperture, thus extruding the semi-molten material in the form of lumps with a certain size.

3,913,797
FLUID DISPENSING SYSTEM

Stanley J. Brym, Torrington, Conn., assignor to Baldwin-Gegenheimer Corporation, Stamford, Conn.

Filed Feb. 11, 1974, Ser. No. 441,101
Int. Cl.² G01F 11/04
U.S. Cl. 222—253 7 Claims



1. In a press washer, a liquid dispensing system of the type which includes a source of liquid, an orifice through which such liquid is to be projected, and a conduit system extending between said source and said orifice for establishing a liquid-bearing connection between them to convey washing liquid to the press parts to be washed comprising,

A. control apparatus to be interposed in the conduit system, such apparatus comprising,

1. a first expansible and collapsible chamber for alternatively

a. establishing flow of liquid from the source to the portion of the conduit system which connects with the orifice when said chamber is collapsed, and

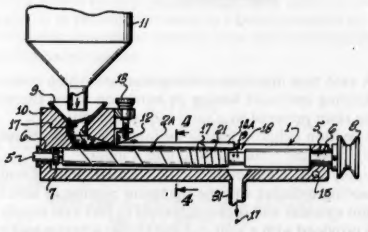
b. a multi-position valve in the conduit system for interrupting such flow, and

2. a second expansible and collapsible smaller chamber inter-connected to said first chamber to operate in opposite expanding or collapsing phase thereto, and being connected to the conduit system through said valve when said valve interrupts flow from said first chamber and effective upon such interruption of flow to establish a negative pressure within the portion of the conduit system which connects with the orifice, thereby to withdraw residual liquid from the orifice.

3,913,798
ATTACHABLE PRECISION UNIT FOR SEED PLANTERS

Steve R. Allen, 2209 Southside Drive, Montebello, Calif. 90640

Filed Oct. 18, 1973, Ser. No. 407,415
Int. Cl.² B65G 33/06
U.S. Cl. 222—281 6 Claims



1. A seed feeding unit comprising:

a pair of rollers on substantially parallel axes and substantially in mutual contact, said rollers defining a drop slot adjacent the ends thereof;

means to rotate said rollers in opposite senses with their top portions moving apart, the adjacent surface elements of said rollers defining an elongated area of juncture;

means to introduce seeds downward into said area adjacent one end of said rollers, said seeds engaging moving surfaces thereof;

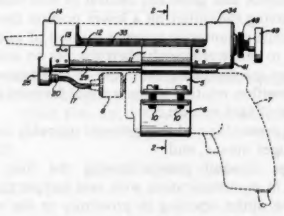
progression means to cause said seeds to progress along said area to a discharge end and drop slot, and

stationary control guides having edge portions extending along and close to said rollers and defining a guide slot, said guide slot being relatively narrow and cooperating with said rollers to dispose said seeds into a single file as they progress along said area toward said discharge end, said seeds dropping through said drop slot into a delivery means for planting.

3,913,799
CAULKING GUN ADAPTER FOR ELECTRIC HAND DRILL

George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20034

Filed Feb. 28, 1974, Ser. No. 446,961The portion of the term of this patent subsequent to Jan. 21, 1992, has been disclaimed.
Int. Cl.² B67D 5/46
U.S. Cl. 222—326 9 Claims



1. A caulking gun attachment for an electric hand drill including in combination securing means for fastening said gun to the body of said drill, a receptacle fastened to said securing means for receiving therein a caulking cartridge having a caulking dispensing nozzle thereon, a threaded piston movable when driven through said cartridge to force the caulking within said cartridge from said nozzle, driving means for said piston including a threaded nut disposed about the threaded surface of said piston and operative when rotated to drive said piston through said cartridge, a speed reducing drive train disposed for connecting said drill with said nut and operative when activated by operation of said drill to effect rotation of said nut, fixed means engaging said piston and operative upon rotation of said nut by said drill to prevent rotation of said piston with said nut and clutch means interposed in said speed reducing drive train between said drill and said nut and operative to interrupt rotation of said nut upon a predetermined arrested movement of said piston during operation of said drill.

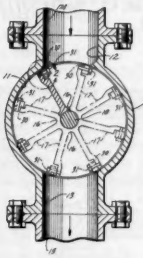
3,913,800
INTERCOMPARTMENT SEAL FOR ROTARY FEEDER

Forrest E. Logan, Claremont, Calif., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Aug. 15, 1973, Ser. No. 388,388
Int. Cl.² G01F 11/20
U.S. Cl. 222—368 11 Claims

5. In a rotary feeder having a housing that defines a cylindrical cavity with a curved peripheral surface, a rotor mounted to rotate inside the cavity of the housing, a plurality of radial compartment defining walls on the rotor extending to a point adjacent to the peripheral surface and including means to seal the ends of the rotor and the cavity, an improved intercom-

partment seal comprising a blade providing a curved substantially sealing surface at the end of each radial wall closely spaced and substantially uniform distance from the peripheral surface, the curvature of the sealing surface and the peripheral



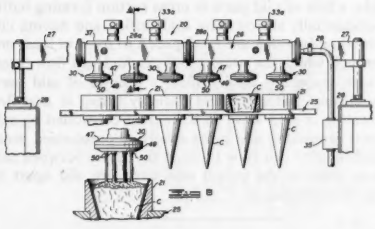
surface of the cavity being substantially the same the spacing between the peripheral surface of the cavity and the curved sealing surface being sufficient to establish laminar fluid flow of a fluid media between the sealing surface and the peripheral surface of the cavity.

3,913,801

NOZZLE ASSEMBLY WITH SUCK-BACK ACTION

Robert T. Wise, Worthington, and David M. Sutton, Columbus, both of Ohio, assignors to Big Drum, Inc., Columbus, Ohio

Filed Feb. 15, 1974, Ser. No. 442,929
Int. Cl.² B67D *5/371, 5/40*
U.S. Cl. 222—375 **7 Claims**



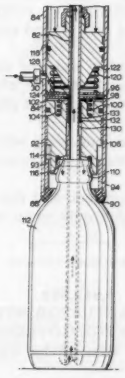
1. A unit for dispensing syrup or the like comprising an elongated manifold having a plurality of nozzle heads carried thereby at spaced intervals therealong and depending therefrom, a supply conduit connected to said manifold for feeding syrup under pressure thereto, said manifold having a common supply passage extending horizontally therealong with an inlet to which said supply conduit is connected, branch passages leading from said common supply passage at spaced intervals along its length to the respective nozzle heads, each of said branch passages comprising an upwardly-directed outlet passage leading from the common passage and having a ball-receiving valve seat at its upper end, a cylindrical ball-receiving chamber with which said upwardly-directed outlet passage connects, a ball mounted in said chamber with close tolerance but free to move vertically therein, said chamber being of a vertical extent substantially greater than the diameter of the ball and being of uniform diameter throughout its vertical extent to permit upward movement under pressure and downward movement by gravity with the ball acting substantially as a piston, and a restricted passageway leading from the upper end of said chamber to its respective nozzle head, whereby when syrup under pressure is supplied to said common passage, there is a build-up in pressure uniformly along its length until it acts simultaneously through all of said outlet passages to unseat all of the identical balls simultaneously to permit flow of syrup into the chambers and past the balls, as they rise into contact with the upper ends of said chambers, and through the restricted passages to the nozzle heads, and when the pressure in said common passage is reduced, the balls will drop downwardly simultaneously through said chambers onto said seats creating a negative pressure through said connected restricted passages to produce a suck-back of syrup at said nozzle heads.

3,913,802

DECANTING DEVICE FOR DECANTING THE LIQUID CONTENTS OF DECAPPED BOTTLES

Daniel DiIanni, Toronto, Canada, assignor to Carling O'Keefe Limited, Toronto, 7, Ontario, Canada

Division of Ser. No. 467,013, May 6, 1974, Pat. No. 3,870,175.
This application Dec. 26, 1974, Ser. No. 536,486
Int. Cl.² B65D *83/14*
U.S. Cl. 222—400.7 **5 Claims**



1. A decanting device for the decanting of liquid from a necked bottle comprising

an elongated hollow right cylindrical element having an inner wall,

mounting means including an end closure at one end of said cylindrical element for mounting said device in substantially fixed position,

a hollow elongate tube extending axially of said right cylindrical element and in slidable relationship with said end closure,

said elongate tube being movable between a first position wherein the open end of said tube is located adjacent the extremity of said cylindrical element remote from said end closure and a second position wherein the open end of said tube is remote from said extremity of said cylindrical element a distance substantially that required to position the open end adjacent the bottom of the bottle from which liquid is to be decanted,

a disc member mounted on the inner wall of the cylindrical element and transverse of the axis thereof, said disc having a central opening through which said tube passes in non-touching relation,

a first plug member situated in sliding relation with the inner wall of said cylindrical element and located between said disc member and said extremity, said first plug member having an axial opening through which said tube passes in normally touching sliding relation over at least part of the length thereof,

said first plug member normally being biased towards said extremity, the limit of movement of said first plug member towards said extremity being defined by a sleeve

fixedly mounted to said inner wall and located adjacent said extremity,

said first plug member being movable against said bias from said limit of movement towards said extremity towards said disc member,

a cup member associated with said first plug member opening towards said extremity and having an inside diameter, at least adjacent the join of the wall and the base, substantially that of the bottle neck, said cup member having an axial opening through which said tube passes,

a second plug member fixedly mounted on said tube and in sliding relation with the inner wall of said cylindrical element, said second plug member being located between said disc member and said end closure,

said second plug member normally being biased towards said end closure and including spacing means engaging said end closure when said tube is in said first position,

said second plug member being movable against said bias towards said disc member and thereby moving said tube towards said second position,

said second plug member and said disc member defining therebetween a first chamber contractable in volume during movement of said second plug member towards said disc member,

said second plug member and said end closure defining therebetween a second chamber expanisble in volume during movement of said second plug member towards said disc member,

first orifice means communicating with said first chamber and second orifice means communicating with said second chamber, and

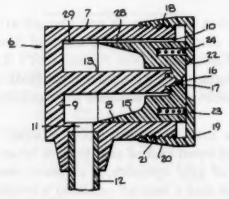
fluid transfer means between said first chamber and said cup member operable only when said tube is in said second position.

3,913,803

AEROSOL VALVE ACTUATOR WITH FRONT END DISCHARGE GOVERNOR

Robert H. Laauwe, 237 Green Ridge Road, Franklin Lakes, N.J. 07417

Filed Dec. 20, 1974, Ser. No. 535,081
Int. Cl.² B65D *83/14*
U.S. Cl. 222—402.11 **5 Claims**



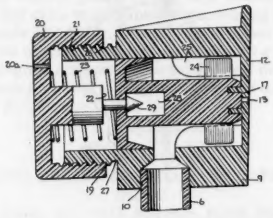
1. An actuator for a tubular stem through which a pressurized product is dispensed, comprising a body having a substantially cylindrical cavity with a closed end back wall and an open front end, said body having a hole opening into said cavity adjacent to said back wall and adapted to receive said stem said body having a rod projecting from said back wall towards said open front end, a piston reciprocating in said cavity and having a discharge orifice and otherwise closing said open end, said rod having a front end positioned to close said orifice when said piston moves backwardly against said rod and to open said orifice when said piston moves forwardly, spring means for biasing said piston backwardly so that the rods said front end normally closes said orifice, and adjustable governor means on the front end of said body for adjustably limiting forward movement of said piston.

3,913,804

AEROSOL VALVE ACTUATOR

Robert H. Laauwe, 237 Green Ridge Road, Franklin Lakes, N.J. 07417

Filed July 19, 1974, Ser. No. 490,077
Int. Cl.² B65D *83/14*
U.S. Cl. 222—402.11 **10 Claims**



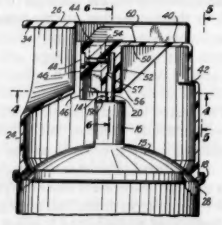
1. An actuator for dispensing a pressurized product and comprising a hollow body having an interior and provided with means for receiving the pressurized product in said interior, said body having a front end wall open to said interior and through which a product-discharge orifice is formed, said body containing a valve having a front end normally seating on the inside of said end wall and closing said orifice and means responsive to fluid pressure of said product in said interior for unseating the valve's front end while said pressure exists and for reseating the valve's front end when said pressure is substantially reduced, and limit means for controlling the extent said valve can unseat, the valve's front end and the inside of said front end wall respectively having cooperative, relatively reciprocative male and female parts with one part fixed to the valve's front end and the other part fixed to the body's front wall inside, a first of said parts in cross section forming baffle means substantially surrounding said orifice and having circumferential ends which are interspaced to form at least one space through which the pressurized product can flow transversely with respect to said orifice, a second of said parts normally closing said space and slidingly fitting in said first part, unseating of said valve to the extent controlled by said limit means separating said parts axially so pressurized product in said interior can flow through the space between said interspaced ends to the extent said parts are slid apart by unseating of said valve.

3,913,805

ONE-PIECE DISPENSER CAP AND CHILDPROOF ACTUATOR

James J. Sette, 5 Hilltop Circle, Brookside, N.J. 07926

Filed Feb. 24, 1975, Ser. No. 552,186
Int. Cl.² B65D *83/14*
U.S. Cl. 222—402.11 **3 Claims**



1. A one-piece molded plastic dispenser cap and childproof actuator for an aerosol dispenser container having a valve assembly mounted in a pedestal, which assembly includes an

upwardly extending hollow valve stem projecting from the pedestal and which upon depression passes product from the dispenser therethrough, said cap and actuator comprising:

a. a cap body having a side wall and a top wall, a portion of said side wall having a re-entrant surface intersecting the top wall and providing an opening for spray discharge of aerosol product therethrough;

b. means on said side wall for securing said cap to said aerosol dispenser container;

c. an elongated actuator arm integrally formed within said cap body, said elongated actuator arm being resiliently hinged at one end to said side wall for rotation about a horizontal axis diametrically opposite said opening, said actuator arm being free at its opposite end for flexural movement transversely of said top wall;

d. said actuator arm having an exposed vertical face at its free end and a discharge orifice in said face, said face being situated behind and being in registry with said opening in said side wall;

e. a hub pendent from the underside of said actuator arm adjacent its free end, said hub having a vertical socket for fitted reception of the valve stem;

f. internal conduit means in said hub connecting said discharge orifice to said socket; and

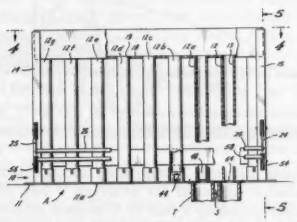
g. control means on said actuator arm integrally formed with said face, said means adapted to prevent the actuation of the actuator arm by a finger having less than a predetermined width.

3,913,806

APPARATUS FOR LOADING FLOWABLE MATERIAL

Richard W. Red, Jr., Alvin, Tex., assignor to Browning-Ferris Industries, Inc.

Filed Nov. 12, 1973, Ser. No. 415,224
Int. Cl.² G01F *11/34*
U.S. Cl. 222—429 **1 Claim**



1. Apparatus for loading flowable granular catalyst material into tubular receptacles at fixed spaced locations, comprising:

a support frame including a base and guide members, said base having a plurality of apertures therein;

a plurality of manifold means positioned on said base and encompassing each of said apertures, each of said manifold means having an opening in one side thereof;

a plurality of ring means having openings in one side thereof and positioned on said base adjacent each of said manifold means;

a valve means positioned between each of said manifold means and said ring means to selectively communicate the interior of each manifold means with the interior of corresponding ring means, each of said ring means including a baffle member for directly material through said opening in said ring means;

a plurality of tubular containers, each container having one end thereof fixed in a corresponding ring means and in communication with said ring means;

a tray slidably mounted on said guide members and containing apertures in the bottom thereof for receiving the other end of said tubular containers; and

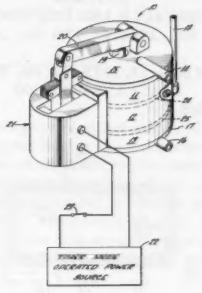
means attached to said tray and pivotally mounted on said frame for moving said tray between first and second positions, in said first position the other end of the tubular containers and the bottom of the tray are adjacent one another, and in said second position the said other end of the tubular containers project through the apertures in the bottom of said tray and extend above the bottom of said tray.

3,913,807

FLUID-METERING APPARATUS

Walter G. Lale, 8391 Cerulean, Garden Groove, Calif. 92641, and Elmer E. Reinmiller, 1120 Ninth St., Manhattan Beach, Calif. 90266

Filed June 12, 1974, Ser. No. 478,743
Int. Cl.² G01F *11/28*
U.S. Cl. 222—442 **1 Claim**



1. Gravity-operated fluid metering means for metering a preselected fluid volume, comprising

a metering chamber enclosing an interior volume corresponding to the preselected fluid volume to be metered and having an intake port at one end of said chamber, an exhaust port at an opposite end of said chamber, and a vent port,

means in fluid communication with said venting port and adapted for venting said metering chamber at a heighth corresponding to the fluid level of an external source of fluid-to-be-metered,

monostable, dual-mode, dual valve means for fluid flow switching of said intake and exhaust ports, said two ports being operated in mutually exclusive states, a stable first state corresponding to an open state of said intake port and a closed state of said exhaust port, and an astable second state corresponding to a closed state of said intake port and an open state of said exhaust port,

said gravity-operated fluid metering means being enclosed within a cylindrical casing having a normally vertical axial extent, said casing being divided into a vertical array at three axial chambers, by two parallel inner walls,

a charging first chamber formed between a top of said casing and a first one of the inner walls parallel to said casing top,

a metering second chamber formed between said first inner wall and a second one of the inner walls,

a discharging third chamber formed between said second inner wall and a bottom of said casing,

each said top of said casing and said inner walls being pierced by a respective aperture to accommodate insertion of an integral valve stem,

said valve stem fixedly mounting two axially spaced valve heads,

said aperture in said top of said casing having an elastomeric seal to seal said aperture in said casing top while allowing

mechanical linkage of said valve stem with electromechanical actuation means;

said aperture in said first inner wall being formed as a first valve seat for a first valve head on said valve stem when moving axially within said charging chamber toward said first inner wall,

said aperture in said second inner wall being formed as a second valve seat for a second valve head formed on said valve stem when moving axially within said second discharging chamber toward said second inner wall,

leaf-type axial-spring loading means within said third chamber for urging said valve axially such that said second valve head tends to seat in said second valve seat,

said charging chamber having an inlet port adapted to be connected to a means for utilizing a metered fluid,

said metering chamber having a vent adapted to extend to a height of said fluid reservoir.

3,913,808

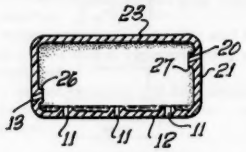
SOAP RECEPTACLE AND DISPENSING DEVICE

Bertha Toliver Hill, 2904 W. 12th St., Los Angeles, Calif. 90006

Filed Sept. 17, 1973, Ser. No. 397,658

Int. Cl.² B65D *83/06*

U.S. Cl. 222—565 **6 Claims**



1. A soap receptacle for holding pieces of solid soap and dispensing a soap solution, said receptacle being of the type having a hollow, flexible, permeable body which permits water to enter and a soap solution to exit wherein the improvement comprises:

a flexible, hollow plastic body having an outer surface in the shape of a common bar of soap having two identical parallel faces joined by two elongated rectangular end surfaces and two elongated rectangular side surfaces, said body having a plurality of openings having a width of about ⅛ inch therethrough;

a soap entry port, sufficient in size to permit the passage of solid pieces of soap into said body, said port having means for closing to prevent any solid soap placed within said body from exiting therethrough; and

means comprising a wall completely surrounding the inwardly directed entrance of each of said openings in said parallel surfaces for holding sufficient water within said body to maintain a portion of solid soap placed therein in a partially dissolved state for at least one day.

3,913,809

VALVE FOR DETECTING PRESSURE DIFFERENCES

Billy Nilson, Mjolby, Sweden

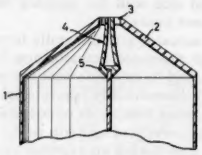
Filed Mar. 7, 1974, Ser. No. 448,878

Claims priority, application Sweden, Mar. 22, 1973, 7304093

Int. Cl.² B65D *5/72*

U.S. Cl. 222—494 **12 Claims**

1. Valve for detecting pressure difference between two spaces comprising a wall separating a first space from a second space wherein one of said spaces may be the free air, said wall having a through opening forming the only communication between said spaces, a closure member and having a relatively thin and resilient portion partially extending into and normally closing said opening which in the closing position of said closure member portion is biassed by its resiliency to follow and sealingly contact the edge of said wall surrounding said opening, said portion projecting also into said first space and having one surface thereof in communication with the medium present in said first space and its opposite surface out of communication with said medium and instead engaging the medium in said second space such that said portion may be



influenced by the action of a pressure difference effected between said first and second spaces, said portion having further a curved cross section corresponding to the curvature of said opening with the curvature of said portion being changed by such pressure difference thereby partly uncovering said wall opening.

3,913,810

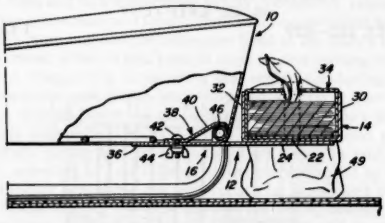
TISSUE DISPENSER WITH CLIPS FOR DISPOSAL BAG

William H. Shaw, Duncansville, Pa., assignor to Joyce M. Woomer, Duncansville; Oliver E. Mattas, Jr., Hollidaysburg and Robert E. Woomer, Duncansville, all of, Pa., part interest to each

Filed Apr. 2, 1974, Ser. No. 457,356

Int. Cl.² B60R *7/00*

U.S. Cl. 224—42.45 B **1 Claim**



1. A tissue dispenser, comprising, in combination:

a. a bracket arranged for retaining a box of tissue, the bracket including a pair of U-shaped members, each of the members having a longitudinally extending web and a pair of parallel, co-directional legs, the webs being connected together at median portions thereof and arranged with the longitudinal extent of the webs perpendicular to one another and with the legs of each of the members extending co-directionally, one web being longer than the other web;

b. mounting means connected to the bracket for attaching same cantilever fashion to a seat, the mounting means including:

1. a first elongated arm connected to the web of one of the members and connected to a second arm arrangeable extending under and against an underside of a seat; and

2. clamp means provided on the second arm for holding the second arm and bracket on a seat cantilever-fashion, the bracket being arranged adjacent the seat, the clamp means including a plate mounted on the second arm, a jaw plate, and fastener means adjustably connecting the jaw plate to the plate for embracing a portion of a seat inserted between the jaw plate and plate whereby the longitudinal dimension of said jaw plate and the second arm project perpendicularly to the longitudinal dimension of the seat when clamped

thereto, and the second arm extends horizontally and perpendicularly to said first elongated arm and parallel to said one web; and

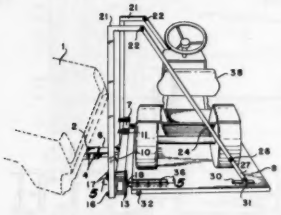
c. a clip mounted on one of the legs of the members and arranged for gripping a disposable waste container, the clip including a pair of jaw elements each having a jaw portion and a handle portion, the handle portion of one of the jaw elements being connected to the one of the legs, and spring means connecting together the jaw elements for biasing the jaw portions of the elements toward one another.

3,913,811

UTILITY CARRIER

Jimmy J. Spencer, 348 Clearfield Ave., Chesapeake, Va. 23320

Filed Aug. 1, 1973, Ser. No. 384,405
Int. Cl.² B60R 9/00
U.S. Cl. 224—42.08 **1 Claim**



1. A foldably mounted utility carrier adapted to be detachably mounted to an automobile and the like standard fixed rectangular shaped trailer sleeve hitch, comprising a rectangular shaped connecting bar mounting sleeve with connecting pin holes therein adapted for telescoping into the fixed rectangular sleeve hitch and affixing it thereto by connecting pin through juxtoposed holes, said connecting bar mounting sleeve being integrally affixed to a rectangular-shaped main structural support member by welded plate triangular braces, said rectangular shaped main structural support member having a foldable platform attached thereto by inverted L-shaped vertical support frame members with pivotal support arm attached thereto by bolting, and adapted for disconnection from said platform and pivoting said platform to a horizontal carry position or to a vertical storage position, said platfrom being hinged to a main support member platform hinges having integral eyelet on the bottom side of said hinges, H-shaped front and rear attachment brackets comprising juxtoposed bolt holes for bolting together the brackets, said front bracket having integral hinge eyelets for receiving said platform hinges to support said platform said pivotal support arms adapted to vertically pass substantially along the bottom of said platform while in a stored upright position and fastening said support arms along the bottom of said platform to the platform hinge eyelets by fastening means.

3,913,812

VACUUM GLASS STRIPPING

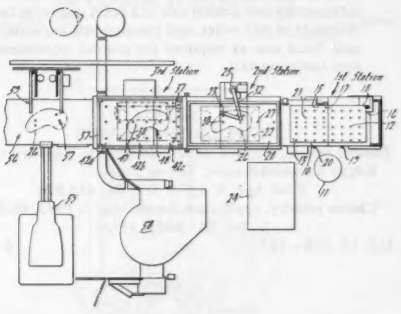
Eugene H. Augustin, Dearborn Heights; Roger E. Johnson, Westland, and Thomas L. Rakestraw, Dearborn, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed June 8, 1973, Ser. No. 368,392
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C03B 33/04
U.S. Cl. 225—2 **7 Claims**

1. A method of cutting a glass bracket, comprising:

a. firstly scoring one surface of said bracket at least at one location by the use of low pressure,

b. secondly scoring said one surface along another location utilizing high pressure, said high pressure scoring being carried out to pass inside of and transverse to the extent of said low pressure scoring, and



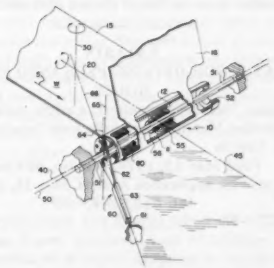
c. while supporting the unscored surface of said bracket on a porous member having stress risers arranged adjacent said scored locations, subjecting the entire scored surface of said bracket to a membrane drawn uniformly downwardly against said bracket by vacuum pressure communicating through said porous member, said membrane causing said bracket to be severed at said secondly scored location in advance of severence at said firstly scored location.

3,913,813

WEB SUPPORT WITH CASTERED AND GIMBALLED ROLLER

John E. Morse, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 10, 1974, Ser. No. 504,777
Int. Cl.² B65H 25/26
U.S. Cl. 226—21 **5 Claims**



1. In a web support for engaging a fully constrained moving web having an entering portion and an exiting portion relative to such web support, said web support being of the type having a web engaging cylindrical roller which presents no lateral resistance to such entering web portion and which angularly decouples such exiting web portion, the improvement which comprises:

a. a fixed support defining a fixed axis;

b. means for mounting said roller on said fixed support to statically and dynamically support said roller solely at a midpoint, and to provide for rotational movement of said roller about a longitudinal axis, pivotal movement of said roller about said midpoint, and translational movement of said roller along said fixed axis; and

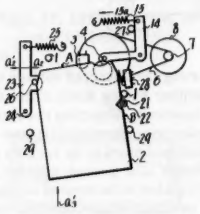
c. means for constraining said pivotal and translational movement of said roller to pivotal movement about a gimbal axis perpendicular to and intersecting said longitudinal axis at said midpoint of said roller and extending in a plane substantially parallel to such entering web portion, pivotal movement about a castering axis substantially perpendicular to such entering web portion and intersecting said gimbal axis at a point upstream from said midpoint of said roller, and translational movement along said fixed axis as required for pivotal movement about said castering axis.

3,913,814

TAPE DRIVING DEVICE

Tatsuro Suzuki, Nagoya, Japan, assignor to Yupiteru Ongaku Kogyo Kabushikikaisha, Tokyo, Japan

Filed Apr. 8, 1974, Ser. No. 458,874
Claims priority, application Japan, May 4, 1973, 48-52933
Int. Cl.² B65H *17/20*
U.S. Cl. 226—187 **6 Claims**



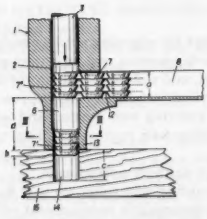
1. A tape driving and locking device for a tape cartridge having a V-shaped groove formed on one side thereof and a tape driving opening on the front side with a pinch roll mounted in said cartridge behind said opening, comprising a first pivoted lever with a capstan mounted on one end and moveable to engage the tape between said capstan and said pinch roll, a first spring connected to said first pivotted lever to bias said capstan toward said pinch roll, a second pivotted lever engageable with said cartridge to lock it in the tape driving position, and a second spring engageable with said second pivoted lever to bias it toward said cartridge.

3,913,815

APPARATUS FOR DRIVING PEGS INTO PRE-BORED HOLES

Anton Holzer, Vienna-Fischamend, Austria, assignor to Wien-Fischamender Metallwarenfabrik Josef Suschny & Sohnne, Vienna, Austria

Filed May 13, 1974, Ser. No. 469,663
Claims priority, application Austria, May 16, 1973, 4306/73
Int. Cl.² B27F *4/00*
U.S. Cl. 227—93 **6 Claims**



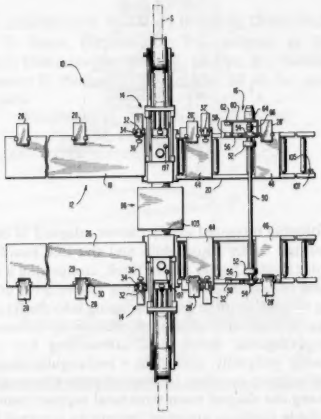
1. Apparatus for driving pegs into pre-bored holes, having a discharge channel which has a lateral feed location for feeding the pegs from a magazine, and a plunger driving the pegs, characterised in that in the terminal position of the driving stroke the frontal face of the plunger (3) is disposed at a distance from the mouth (13) of the driving channel (6) which corresponds to the length of the peg (7) minus a fraction thereof, that the length of the discharge channel (6) from the lower margin of the feed location (8) for the pegs (7) to its mouth corresponds at least to the length of the peg (7) minus a fraction of its length, and that means are provided for clamping the peg(7') in the mouth (13) of the discharge channel (6).

3,913,816

APPARATUS FOR FABRICATING WOODEN FRAMES AND THE LIKE

John Calvin Jureit, Coral Gables; Roy Leutwyler, Miami; Larry Brodsky, Miami, and Benjamin Kushner, Miami, all of Fla., assignors to American Building Components, Inc., Fla.

Continuation of Ser. No. 317,095, Dec. 20, 1972, abandoned.
This application July 12, 1974, Ser. No. 488,006
Int. Cl.² B27F *7/02*
U.S. Cl. 227—95 **75 Claims**



1. Apparatus for cutting elongated sheet metal connector stock of the type having a plurality of teeth struck integrally therefrom to form a discrete connector plate and and embedding the teeth of the connector plate into a pair of adjoining wooden members comprising:

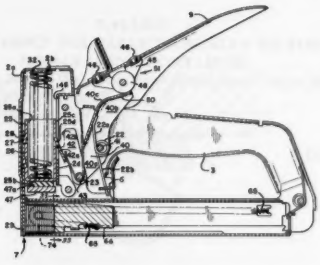
support structure, a press head carried by said support structure for movement along a predetermined path, means for moving said press head along said predetermined path, a cutting edge carried by said press head for movement therewith, means carried by said support structure for feeding a predetermined length of connector stock in a substantially fixed plane into the path of the movement of said head, reaction means fixed to said support structure and cooperable with said cutting edge for cutting the stock as said press head moves along said path thereby to form a connector plate of predetermined length, means carried by said apparatus for locating the adjoining wooden members in opposition to said press head, said head being adapted to press the teeth of the connector plate into one side of the adjoining wooden members upon continued movement of said head along said path, said reaction means including a guide member having a plurality of tines defining a plurality of laterally spaced recesses for receiving and guiding the teeth of the connector stock, the ends of said tines being engageable against the side of the stock from which the teeth project

and against the stock when said reaction means cooperate to cut the plate.

3,913,817
FASTENING ELEMENT DRIVING TOOL

Edward E. Barrett, Massapequa Park, L. I., and Morris Pinczewski, New York, both of N.Y., assignors to Swingline, Inc., Long Island City, N.Y.

Continuation-in-part of Ser. No. 328,700, Feb. 1, 1973, abandoned. This application Jan. 30, 1974, Ser. No. 438,168
Int. Cl.[2] B25C *5/10, 5/16*
U.S. Cl. 227—126 **14 Claims**



1. A tool for driving a fastening element into a work piece comprising:

a. a frame;

b. magazine means mounted on the frame for feeding a fastening element to a driving station;

c. spring loaded ram means mounted on the frame for movement through an arming stroke against the force of the spring in a direction away from the driving station and movement back toward the driving station through a driving stroke under the force of the spring into driving contact with a waiting fastening element situated at the driving station;

d. movable means engageable with the ram means for advancing the ram means through the arming stroke, said movable means including:

1. a pivotally mounted member engaging the ram means during the arming stroke; and

2. spring means normally holding the pivotally mounted member in engagement with the ram means during the arming stroke;

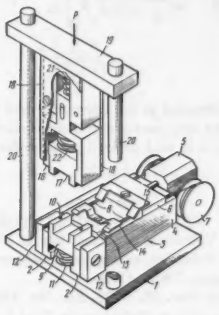
e. release means for effecting disengagement between the ram means and the movable means upon completion of the arming stroke, said release means including:

a pin element mounted on the frame for rotation between a first angular position where a first surface on the pin element is disposed alongside the path of movement of the pivotally mounted member without causing the member to rotate and a second angular position where a second surface on the pin element is disposed in the path of movement of the pivotally mounted member to cause the member to rotate, said pin being disposed in the first angular position during the arming stroke; and a manually operable lever means connected to the pin element for rotating the pin element into said second angular position upon the completion of the arming stroke to bring the said second surface into contact with the pivotally mounted member out of engagement with the ram means to thereby permit movement of the ram means through the driving stroke.

3,913,818
DEVICE FOR PREPARING INTEGRATED MICROCIRCUITS FOR PRINTED WIRING

Anatoly Alexandrovich Osipov, Kadomtseva, 7, kv. 26, and Nikolai Semenovich Pekov, ulitsa B. Mariinskaya, 2, kv. 77, both of Moscow, U.S.S.R.

Filed Oct. 26, 1973, Ser. No. 410,257
Int. Cl.[2] B23K *21/00;* **B23P** *3/02*
U.S. Cl. 228—3.1 **3 Claims**



1. A device for preparing integrated microcircuits for printed wiring comprising in combination: a base; a female die in the form of two jaws; said jaws having lower surfaces which are fixedly attached to said base; upper surfaces of said jaws being located opposite to said lower surfaces; inner surfaces of said jaws being in perpendicular to said lower surfaces and facing each other; and outer surfaces of said jaws extending in parallel with the said inner surfaces; a microcircuit holder located between said jaws for gliding movement on said inner surfaces of the jaws; a spring between said base and said holder for normally biasing the latter away from the former; a solder supply unit; guides for said solder supply unit being disposed on the level of said upper surfaces of the jaws so as to extend in parallel with their inner surfaces and adapted to supply solder immediately below the ends of the outputs of said microcircuits; knives for cutting off the outputs of said microcircuits; a punch having a groove located directly opposite to said holder for the microcircuits; a clamp disposed in said groove; a second spring disposed in said groove between said punch and said clamp; a plate interacting with said punch so as to be movable relative to the latter in the direction of punch motion and of absorbing the working pressure thereof; a third spring disposed between said plate and said punch; and a means for cutting off a predetermined portion of the solder required for one microcircuit.

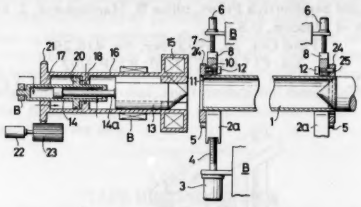
3,913,819
APPARATUS FOR TACK WELDING OF FLANGE

Kiyoshi Hirose; Kaoru Shiozawa, both of Ichihara, and Yuzi Saito, Yokosuka, all of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd., Tokyo, Japan

Filed May 24, 1973, Ser. No. 363,498
Claims priority, application Japan, June 2, 1972, 47-54995
Int. Cl. B23k *37/02;* **B21d** *19/00;* **B23k** *37/04*
U.S. Cl. 228—4.1 **1 Claim**

1. Apparatus for tack welding a flange to a pipe, comprising a plurality of radially-adjustable jaw means for clamping a pipe at a plurality of locations about its periphery to support said pipe, at least one of said jaw means having a side positioned adjacent one end of said clamped pipe, radially-adjustable flange supporting means positioned adjacent said end of said pipe for receiving a flange dropped thereon, means reciprocable along the axis of said pipe for picking up said received flange and delivering it into abutment with said side of said at least one of said pipe-supporting jaws in the desired position

for welding of said flange to said pipe, and a plurality of welding torches provided on a plurality of said jaws, said welding



torches being directed at the corner formed by said pipe and said flange when said jaws are in their pipe-clamping position and said flange is in said desired position for welding.

3,913,820

WELDING MANIPULATOR

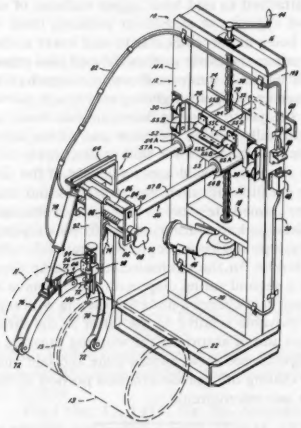
Lamar Travis Valentine, deceased, late of Houston, Tex. (by Ruth Elaine Valentine, executrix), assignor to Welding Processes Company, Tulsa, Okla.

Filed Mar. 30, 1973, Ser. No. 346,585

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B23K *5/00, 5/02*

U.S. Cl. 228—25 **7 Claims**



1. Welding manipulator apparatus for use in the welding of abutted ends of two lengths of pipe while they are revolved about their longitudinal axis, comprising:

a frame having spaced apart upright members;

a carriage on said upright members of said frame;

a boom housing mounted with said carriage, said boom housing comprising horizontal cylinder means positioned transversely to said carriage;

pivotal mounting means pivotally connecting said boom housing horizontal cylinder means to said carriage for pivotal movement of said boom housing horizontal cylinder means relative to said frame;

a boom slidably supported in said boom housing horizontal cylinder means and projecting therefrom for movement in forward and rearward directions relative to said frame;

a welding head mounted with said boom forwardly of said frame for positioning adjacent to a welding surface and for movements with said boom; and

pipe engaging means mounted with said boom forwardly of said frame for engagement with at least one length of pipe in proximity to the welding surface to be welded for movements in response to variations in the external configuration of the pipe, whereby movements of said pipe engaging means are transmitted to said boom for causing corresponding movements of said welding head.

3,913,821

VEE-WELDING

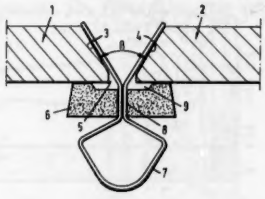
Mark Brandsma, Bergum, Netherlands, assignor to Varios-Fabrieken B.V., Groningen, Netherlands

Filed Aug. 21, 1974, Ser. No. 499,179

Claims priority, application Netherlands, Aug. 22, 1973, 7311569

Int. Cl.² B23K *5/22*

U.S. Cl. 228—216 **4 Claims**



1. A method of closing a joint on one side between two sheets having V-shaped diverging edges spaced apart at the apex of the V as they are being welded together on the other side, comprising the steps of

placing on the one side a backing member having at least one throughbore so that said backing member will extend along and abut each sheet adjacent the apex of the V;

inserting a retaining element having an eye loop at one end and diverging legs at the other end;

said insertion step allowing said legs to diverge to a predetermined angle between the sheets; and

rotating said retaining element 90° to thereby move said legs into abutment with the diverging edges of the sheets to form an angle less than said predetermined angle.

3,913,822

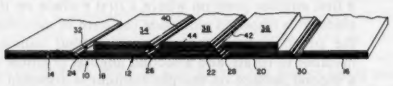
TWO COMPONENT DOUBLE THICKNESS SHIPPING CONTAINERS

Harry D. Heaps, Jr., Villanova, Pa., assignor to Connelly Containers, Inc., Bala Cynwyd, Pa.

Filed Dec. 19, 1974, Ser. No. 534,311

Int. Cl.² B65D *5/32, 13/04*

U.S. Cl. 229—23 R **11 Claims**



1. A shipping container made of two blanks of material comprising:

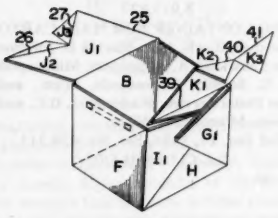
a. a first blank comprising a first pair of spaced panels, a second pair of spaced panels each inwardly of a panel of said first pair and hingedly connected thereto by linearly extending hinge means, and an interior panel between and hingedly connected by linearly extending hinge means to said panels of said second pair of panels, said hinge means being parallel,

b. a second blank comprising a pair of spaced panels and an interior panel between and hingedly connected thereto by linearly extending parallel hinge means,
c. means securing the interior panel of said second blank in overlying relationship to the interior panel of said first blank with the hinge means of said second blank parallel to and laterally inwardly of the hinge means and said first blank interior panel,
d. said spaced panels of said second blank being inwardly of and substantially coextensive with said second pair of panels of said first blank, and
e. said first pair of panels of said first blank being in adjacent substantially coextensive overlapping relationship, parallel to said interior panels and perpendicular to said panels of said second pair.

3,913,823
PAPER PRODUCT FOLDABLE MANUALLY TO FORM A NON-LEAKING CONTAINER

Tenhon Lin, No. 53 Tai Ping Road, Hsin Tien, Taipei Hsien, Taiwan, China /Taiwan

Filed May 29, 1974, Ser. No. 474,222
Int. Cl.² B65D 5/26
U.S. Cl. 229—31 FS 9 Claims

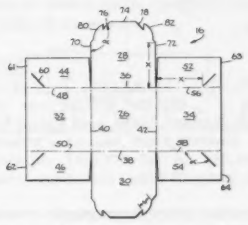


1. A blank of foldable sheet material for forming a leaktight container for liquids comprising: a multi-sided, bottom-forming panel substantially centrally of said blank; a plurality of wall-forming panels joined to the sides of said bottom-forming panel along a continuous fold line; corner panels substantially commensurate in width with the wall-forming panels and joined along fold lines to adjacent edge portions of the wall-forming panels, said corner panels each having a diagonally extending fold line therein extending outwardly from said continuous fold line; a locking panel joined along a fold line to an outer edge portion of each wall-forming panel in an opposed pair of said wall-forming panels, each of said locking panels having a slit therein extending inwardly from an outer edge portion thereof toward the fold line joining the locking panel with a respective wall-forming panel; and a fold line extending diagonally outwardly from an inner end of the slit to an adjacent outer corner of the respective locking panels, thus defining a pair of generally triangularly shaped locking flaps on each of said locking panels, whereby the blank may be folded along said fold lines to dispose said wall-forming panels in an upright position and said corner panels folded inwardly over an exterior surface of said opposed pair of wall-forming panels and the locking panels folded downwardly over said pair of wall-forming panels and the locking flaps folded inwardly and upwardly beneath the corner panels to form a leaktight container for liquids and the like.

3,913,824
FOLDING CONTAINER AND BLANK FOR MAKING SAME

Richard E. Paige, New York, N.Y., assignor to Climax Manufacturing Co., Castorland, N.Y.

Filed Feb. 28, 1973, Ser. No. 336,546
Int. Cl.² B65D 5/26
U.S. Cl. 229—35 22 Claims

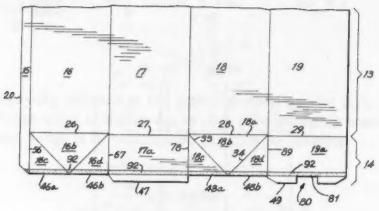


1. A blank for forming a folding container comprising:
a. a base panel having opposed first and second side edges and opposed first and second end edges,
b. first and second side panels joined along a first end edge thereof to said first and second side edges of said base panel respectively, each of said side panels including first and second side edges extending from said base substantially perpendicular to said base panel side edges for a predetermined distance *x*, first and second diagonal edges forming an obtuse angle α with said first and second side edges respectively of said side panels and a first exterior edge joining the ends of said first and second diagonal edges, first and second locking tabs extending outwardly from said first and second diagonal edges and adjacent to said first exterior edge,
c. first and second end panels joined along a fold line to said first and second end edges of said base panel respectively,
d. a first flap joined along one side edge of said first end panel and a second flap joined along the opposite side edge of said first end panel, a third end panel, a third flap joined along one side edge of said second end panel and fourth flap joined along a second side edge of said second end panel, each of said flaps having a second exterior edge remote from said base panel and having a slit therethrough adjacent to said second exterior edge, a line drawn along each of said slits forms an angle α with the fold line of the respective flap and intersects the fold line at a distance *x* spaced from the nearest end edge of said base panel, each of said slits being adapted to receive one of said tabs,
whereby folding said first and second end panels upwardly along their respective fold lines and said first, second, third and fourth flaps along their respective fold lines and said first and second side panels along their respective fold lines places said first side panel contiguous to said first and third flaps and said second side panel contiguous to said second and fourth flaps and places the tabs on said first and second side panels in alignment with said slits in said flaps, whereby said tabs are adapted to be received by said slits in a locking relationship, and whereby said diagonal edges are in substantial alignment with said slits and the side edges of said first and second side panels are substantially aligned with the adjacent end panels producing a container simulating a set-up box.

3,913,825
LEAK PROOF BOTTOM FOR A PAPERBOARD CONTAINER

Milton A. Brownlee, and Robert L. Lanham, both of Mobile, Ala., assignors to International Paper Company, New York, N.Y.

Filed July 12, 1973, Ser. No. 378,491
Int. Cl.² B65D *5/08, 5/40, 5/62*
U.S. Cl. 229—38 **16 Claims**



1. In combination with a thermoplastic coated paperboard blank adapted to be erected to form a heat sealed container, said blank having a body forming portion and a bottom forming portion, said bottom forming portion including two spaced apart gusset forming flaps having substantially aligned transverse edges and forming gusset points and gusset channels when said blank is erected, a cover flap foldably connected by a longitudinal fold line to at least one of said gusset forming flaps, and a tuck-in flap foldably connected by a longitudinal fold line to at least one of said gusset forming flaps, the improvement which comprises;

a. the longitudinal length of at least the center portion of said tuck-in flap being approximately equal to one half the width of one of said gusset forming flaps and the remainder of said tuck-in flap disposed to entirely underlie said gusset forming flaps when said blank is erected; and

b. a narrow band of thermoplastic material disposed upon the interior side of at least one of said bottom forming flaps so as to extend outwardly from said gusset points and along said gusset channel when a container is formed from said blank, said band of thermoplastic material having a thickness of at least approximately 5 mils and a longitudinal dimension less than the longitudinal length of said bottom forming flaps, the thickness and area of said band being such that, when a container is formed from said blank and said thermoplastic material is melted, it will not cover the entire area defined by said bottom forming flaps, whereby, when said blank is formed into a container, said thermoplastic material will seal at least the center portion of said gusset channels and at least the center portion of the tuck-in flap channel which is formed when said container is formed.

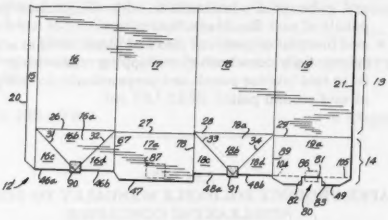
3,913,826
LEAK PROOF BOTTOM FOR A PAPERBOARD CONTAINER

Milton A. Brownlee, Mobile, Ala., and Thomas A. Tomlin, Isle of Palms, S.C., assignors to International Paper Company, New York, N.Y.

Filed July 12, 1973, Ser. No. 378,535
Int. Cl.² B65D *5/08, 5/40, 5/62*
U.S. Cl. 229—38 **11 Claims**

1. In combination with a thermoplastic coated paperboard blank adapted to be erected to form a square, heat sealed container, said blank having a body forming portion and a bottom forming portion, said bottom forming portion including two spaced apart gusset forming flaps having substantially aligned transverse edges and forming gusset points when said blank is erected, a cover flap foldably connected by a longitudinal fold line to at least one of said gusset forming flaps, and a tuck-in flap foldably connected by a longitudinal fold line to at least one of said gusset forming flaps, the improvement which comprises:

a. at least the center portion of the transverse edge of said tuck-in flap being substantially aligned with the transverse edges of said gusset forming flaps and the remainder of the edges of said tuck-in flap disposed to entirely underlie said gusset forming panels when said blank is erected; and

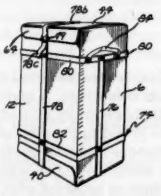


b. a thermoplastic film patch bonded to at least one of said flaps adjacent to the center of the transverse edge thereof and extending beyond the transverse edge of said gusset forming flaps whereby, when said blank is erected and heat sealed to form a container, both said gusset points and the center portion of the transverse edge of said tuck-in flap are sealed by said thermoplastic film patch.

3,913,827
SHIPPING CONTAINER FOR MAIL CARTONS

Arnold D. Bruckner, Bowie, Md.; Marlyn D. Johnson, Minneapolis, Minn.; Marshall A. Rappaport, Minneapolis, Minn., and Daniel E. Sevillia, Minneapolis, Minn., assignors to United States Postal Service, Washington, D.C. and Liberity Carton Service, Minneapolis Minn.

Filed Jan. 17, 1974, Ser. No. 434,211
Int. Cl.² B65D *5/08*
U.S. Cl. 229—38 **3 Claims**



1. A material handling container formed from a single blank of cut and scored fiberboard, and comprising:

a pair of opposite, upright front and rear walls;

a pair of opposite, upright side walls extending between said front and rear walls at substantially right angles thereto from fold line connections with at least one of said front or rear walls and cooperating therewith to define a substantially rectangular container;

a bottom end closure wall closing the bottom end of said container;

a top end closure for said container comprising a cover panel hingedly attached along one longitudinal edge thereof to the top edge of said rear wall by a fold line connection therewith, whereby said cover panel is foldable downwardly over the top end of said container to a closed position, and a closure flap hingedly attached to the front edge of said cover panel along a fold line connection therewith, said closure flap being disposed in a

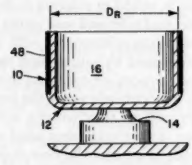
downwardly folded position over the outside face of the top end of said front wall when said cover panel is in said closed position; and

a strap carrying harness embracing said container and having at least one strap extending completely, vertically around said container lengthwise of said front and rear walls, and at least one additional strap extending horizontally, completely around the upper end of said container generally at right angles to said vertically extending strap and having carrying handles on opposite end portions thereof, said vertically extending strap having a pair of releasably engagable end segments attached to said horizontal strap at their lower ends on opposite sides of said container and extending freely upwardly from said points of attachment over said cover panel and said closure flap and secured together to hold said top end closure in its closed position.

3,913,828
REINFORCING ULTRA-CENTRIFUGE ROTORS

Paul A. Roy, Andover, Mass., assignor to Avco Corporation, Cincinnati, Ohio

Filed Sept. 2, 1971, Ser. No. 177,379
Int. Cl. B04b *7/06*
U.S. Cl. 233—27 **6 Claims**

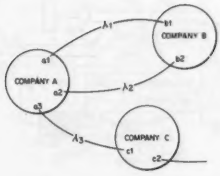


1. A reinforced ultra-centrifuge rotor comprising:
a. a titanium bowl element; and
b. a plurality of turns of a filamentary material having a lower density, higher modulus of elasticity and higher tensile strength than titanium, secured around the periphery of said rotor element, whereby the maximum rate of rotation of said rotor is substantially increased.

3,913,829
ECONOMIC DISPATCH TECHNIQUE FOR INTERCONNECTED POWER SYSTEMS

Lester H. Fink, 11304 Full Cry Court, Oakton, Va. 22124

Continuation of Ser. No. 293,010, Sept. 28, 1972, abandoned.
This application May 29, 1974, Ser. No. 474,262
Int. Cl.² G06F *15/56, 15/06;* **H02J** *3/06*
U.S. Cl. 235—151.21 **10 Claims**

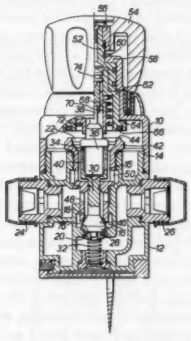


1. An interconnected power system comprising:
a. a plurality of subsystems each having a plurality of power generation units coordinated by a local generation coordination control system for developing generating requirements for said units in response to subsystem generating requirements, said subsystems being interconnected to transmit power among each other;
b. system digital computer means having a stored program for performing, at least at the rate of significant change of subsystem generating conditions, the function of explicitly calculating, for each of said subsystems, a subsystem dispatch signal as a function of power flow within each such subsystem, and
c. transmission means for coupling, at least at said rate, status information from said local generation control systems to said system computer means, and for coupling, at least at said rate, corresponding subsystem dispatch signals back to control and to coordinate the operation of said power generation units.

3,913,830
MIXER VALVES

Victor Howard George King, Ilford, England, assignor to Barking Brassware Co. Limited, Essex, England

Filed Jan. 14, 1974, Ser. No. 433,209
Claims priority, application United Kingdom, Jan. 15, 1973, 2053/73
Int. Cl.² G05D *23/00*
U.S. Cl. 236—12 R **8 Claims**

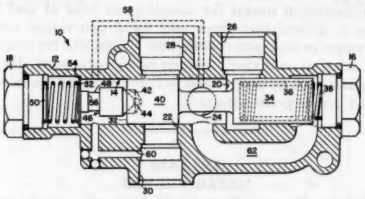


1. A mixing valve comprising in combination a valve body defining a mixing chamber having a pair of inlets and an outlet for mixed fluid,
an inlet valve member movable to vary inversely the openings of the inlets,
an outlet valve member movable to open and close the outlet as desired,
control means for moving the outlet valve member,
a thermostat element arranged to sense mixed fluid temperature and to cause movement of the inlet valve member relative to the control means,
first resilient means disposed between the inlet valve and the valve body, and,
second resilient means opposing the first resilient means and disposed between the inlet valve means and the control means,
wherein the second resilient means is held in a prestressed condition while the outlet is opened, the arrangement being such that operation of the control means to close the outlet first overcomes the first resilient means and closes one of the inlets, and then overcomes the second resilient means and closes the outlet.

3,913,831
OIL COOLER BYPASS VALVE

John Frank Talak, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Mar. 22, 1974, Ser. No. 453,092
Int. Cl.[2] F01P 1/02
U.S. Cl. 236—34.5 2 Claims



1. An oil cooler bypass valve, comprising: a valve body containing a valve bore having first and second closed ends and intersected at spaced locations by inlet, outlet, return and sump ports respectively adapted for connection to the outlet of an oil-controlled vehicle function, and oil cooler inlet, and oil cooler outlet and an oil reservoir; said inlet port being between said outlet and return ports; a valve spool axially shiftably mounted in said bore and including first and second lands at opposite ends thereof; said first land including an axial recess; an axially extendible and retractable thermostatic element normally located in an operative position in the bore adjacent said first land and including an end portion received in said recess and further including a positioning surface normally engaged with a shoulder of the bore facing axially away from the first land; a first biasing means urging said element against said shoulder; passage means connected between said inlet port and said bore at a location in fluid communication with said thermostatic element; and second biasing means exerting less force than said first biasing means and urging said valve spool toward said thermostatic element; said thermostatic element being responsive to the temperature of oil at said inlet and being in a completely retracted condition when the oil is below a predetermined first temperature and in a fully extended condition when the oil is above a predetermined second temperature higher than the first temperature, said valve spool being shifted against said second biasing means by said thermostatic element during extension of the latter and said first and second lands being so located relative to said outlet and sump ports that said inlet port is respectively blocked from said outlet port and connected in fluid communication with said sump port by a path through the bore when the thermostatic element is in its completely retracted condition, and is respectively connected in fluid communication with said outlet port by a path through the bore and blocked from fluid communication with said sump port when the thermostatic element is in its fully extended condition.

3,913,832
ASPIRATING THERMOSTAT

Frank J. Dean, Jr., Kansas City, Mo., assignor to Tempmaster Corporation, Kansas City, Mo.

Continuation-in-part of Ser. No. 327,011, Jan. 26, 1973, Pat. No. 3,817,452. This application Mar. 8, 1974, Ser. No. 449,373
Int. Cl.[2] F24F 11/04; G05D 23/08
U.S. Cl. 236—49 4 Claims

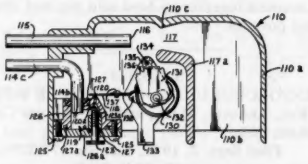
1. An aspirating thermostat for use with an air duct ventilation system, said system having a mechanism for varying the volume of air flow through the duct outlet into the room being temperature conditioned, the improvement comprising:

means defining a passage for exhausting air from said mechanism and terminating in a thermostatically controlled bleed port,

a casing for said thermostat having an inlet and an outlet for accommodating flow of ambient air therethrough, said casing being connected with said passage defining means wherein said bleed port opens inside of said casing,

a thermally responsive valve means mounted inside said casing intermediate said inlet and said outlet thereof and movable toward and away from said bleed port to vary the exhaust of air from said mechanism to thereby control pressure therein, said valve means being movable in response to a change in temperature in the ambient air,

means located within said casing for inducing by aspiration a flow of ambient air through said inlet across said thermally responsive valve means and out said outlet whereby



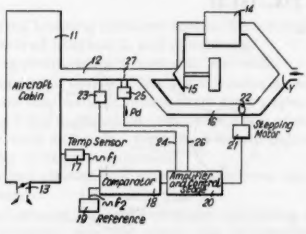
said valve means is positioned and volume of air flow through said duct is varied in relation to the temperature of the ambient air, said inlet and said outlet for said casing being in communicating relationship with the room being temperature conditioned by said system thereby creating a continuous flow of room air over said thermally responsive valve means to accurately sense the room air temperature and to vary said air flow volume accordingly and

a restrictor member operatively associated with said bleed port and adjustable to control the flow therethrough, said restrictor member being accessible for adjustment exteriorly of said casing to limit the maximum flow rate through said bleed port and thereby limit the maximum quantity of conditioned air discharged into said room.

3,913,833
AIR CONDITIONING SYSTEMS

Herbert Hargrave Basil Minett, Chalfont-St. Peter, and Gordon Horsford Stockwell, St. Albans, both of England, assignors to Hawker Siddeley Dynamics Limited, England

Filed Sept. 15, 1972, Ser. No. 289,338
Claims priority, application United Kingdom, Sept. 21, 1971, 10450/71
Int. Cl.[2] F24F 11/04; F15C 4/00
U.S. Cl. 236—49 6 Claims



1. An air conditioning system for controlling the air supply to an enclosure comprising:

temperature-responsive means responsive to the air temperature in the enclosure and delivering a first variable pulse train signal wherein the number of pulses occurring in

unit time represents the actual temperature in said enclosure;

reference signal-generating means delivering a second pulse train signal wherein the number of pulses occurring in unit time represents a desired temperature for said enclosure;

a digital comparator receiving said first and second pulse train signals and having first and second output channels, the comparator being operative to deliver output pulses the number of which occurring in unit time represents the difference between actual temperature and desired temperature, said output pulses appearing on said first output channel if the frequency of pulses in said actual temperature signal pulse train exceeds the frequency of pulses in said reference signal pulse train, said output pulses appearing on said second signal channel if the frequency of pulses in said reference signal pulse train exceeds the frequency of pulses in said actual temperature signal pulse train;

a digital logic network receiving and processing the output pulses on said first and second output channels from said digital comparator, said logic network having at least three phase channels operative in response to said output pulses to deliver processed pulses sequentially in said channels at a rate proportional to the pulse frequency of said output pulses received from the comparator, said processed pulses being delivered by said phase channels in one sequence if the comparator output pulses appear on its first comparator output channel and in the reverse sequence if the comparator pulses appear on its second output channel;

a fluid flow control valve controlling flow of air in a duct leading to said enclosure;

a digital valve actuator operative to change the position of said valve by moving it through a discrete increment in response to each processed pulse delivered thereto on said at least three phase channels by said digital logic network, said actuator operating at a speed determined by the rate of delivery of said processed pulses on said phase channels and in one direction or the reverse direction according to whether the pulses applied to said phase channels are in said one sequence or said reverse sequence.

3,913,834

HEATING INSTALLATION FOR MOTOR VEHICLES

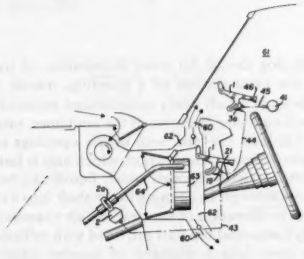
Ottmar Supper, Sindelfingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 9, 1973, Ser. No. 386,971

Claims priority, application Germany, Aug. 10, 1972, 2239303

Int. Cl.² B60H *1/02*

U.S. Cl. 237—12.3 A **16 Claims**



1. In a heater actuating installation for controlling an air-side heating system for different portions of a motor vehicle passenger compartment, said heating system being of the type having a feed line for circulating heating medium to a heater body means and heating duct means including duct valve means for circulating heated air to the passenger compartment, and said heater actuating installation comprising

at least one adjusting lever means for controlling the supply of heat to the motor vehicle passenger compartment, said adjusting lever means operatively connected to said duct valve means for controlling the flow of circulated heated air to the passenger compartment,

at least one rotary slide valve means for controlling the supply of the heating medium to the heater body means, said rotary slide valve means being connected with respect to said adjusting lever means to be actuated by said adjusting lever means, thereby enabling circulation of the heating medium to the heater body, and

pneumatic means for selectively supplying the heating medium to said heater body means, said pneumatic means being connected to said rotary slide valve means to be responsive to variable pressure levels provided by a source of variable pressure as a function of the actuation of said rotary slide valve means by said adjusting lever means,

the improvement comprising at least two of said adjusting lever means and rotary slide value means operatively connected in said motor vehicle compartment for supplying heat to separate portions of the motor vehicle passenger compartment by independent and concurrent actuation of said heating system.

3,913,835

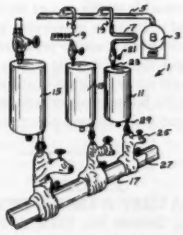
FREEZE-PROOF STEAM TRAP SYSTEM, PACKAGE AND METHOD

Edward J. O'Brien, Des Peres, Mo., assignor to O'Brien Corporation, St. Louis, Mo.

Filed Feb. 28, 1974, Ser. No. 447,019

Int. Cl.² F24D *1/02*

U.S. Cl. 237—67 **29 Claims**

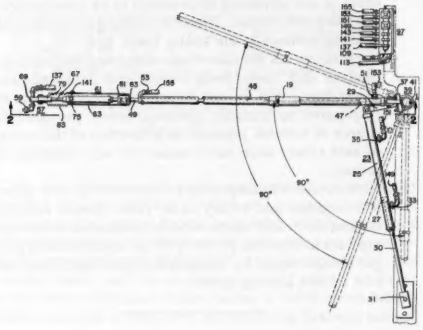


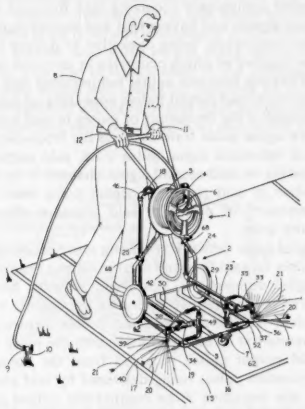
16. In a steam heating system including a steam source, a heat exchange device connected to the steam source, a discharge manifold for receiving hot condensate from the heat exchange device and from at least one other source, and a steam trap connected between the heat exchange device and the discharge manifold, the steam trap containing condensate which is subject to freezing at least when the steam trap is cut off from the steam source, the improvement comprising protective means for protecting said steam trap from ambient temperatures substantially below the freezing point of the condensate in it, said protective means comprising heat pipe means for transferring heat energy, in the form of vapor, from the discharge manifold into proximity with the body of the steam trap, heat transfer means for transferring the latent heat of the vapor to the condensate in the steam trap, and insulative means for insulating the heat transfer means and the condensate in the steam trap from the ambient.

3,913,836
SPRAY RIG ASSEMBLY

James S. Stevenson, 4230 St. Andrews Road, Oakland, Calif. 94605

Filed May 1, 1974, Ser. No. 465,912
Int. Cl.² B05B 1/20
U.S. Cl. 239—166 7 Claims





1. A spray rig adapted primarily for roadside spraying from a moving vehicle, comprising an articulated boom assembly mountable on such vehicle within view of an operator on such vehicle, said boom assembly including a boom and a plurality of hydraulic boom position adjusting means coupled to said boom, each boom position adjusting means determining a different range of positions of said boom with respect to surfaces to be sprayed, a spray head assembly, means mounting said spray head assembly at the end of said boom, a source of spray solution, and means for conveying spray solution from said source and delivering it under pressure to both said spray head assembly, and said hydraulic boom position adjusting means, whereby said spray solution is utilized as the hydraulic fluid in said hydraulic boom position adjusting means, thereby eliminating the need for a second power source.

3,913,837
SPRAY/JET WASHING DEVICE

Marshall D. Grant, Drawer No. 3128, El Paso, Tex. 79923

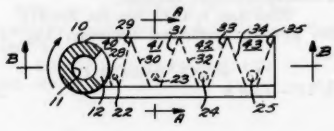
Filed Aug. 13, 1974, Ser. No. 497,058
Int. Cl.² B05B 3/00, 9/02
U.S. Cl. 239—198 4 Claims

1. A device for washing and sweeping planer surface areas which is adapted to be mounted on a multi-wheeled vehicle and comprising: two "L" shaped conduits joined together at one end and adapted to receive a common source of washing fluid, the longer leg of each conduit extending parallel to the other and each being joined at its other end to a further horizontal conduit extending at roughtly right angles thereto, said horizontal conduits projecting in the same plane and parailel to one another and terminating in a set of three nozzles, each set of nozzles being generally directed outwardly in a direction perpendicular to said horizontal conduits; and each set of nozzles comprising: (1) a wash nozzle adapted to eject a broad fan knife edge spray which strikes the surface of the wash area at an angle of about 15°, (2) a repulsion jet nozzle disposed above and in verticle alignment and with said wash nozzle adapted to eject a narrow stream of fluid at an angle of about 30° to the surface of the wash area and at a point slightly forward of the wash nozzle spray and, (3) a drying jet nozzle disposed below and in vertical alignment with said wash nozzle and adapted to provied a narrow jet stream which strikes the surface of the wash area at an angle of about 5° thereto at a point slightly rearward of the wash nozzle spray.

3,913,838
CLOG-PROOF LIQUID DISTRIBUTION DEVICE

Johan Christoffer Frederik Carl Richter, St. Jean Cap Ferrat, France, assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 23, 1974, Ser. No. 500,015
Claims priority, application Sweden, Aug. 30, 1973, 7311756
Int. Cl.² B05B 3/00, 1/14; A62C 31/02
U.S. Cl. 239—225 4 Claims



1. An anti-clog device for even distribution of treatment liquid over the cross-section of a standing, mainly circular container, through which finely comminuted material can be moved in the lengthwise direction of the container, said device consisting of at least one arm with nozzle openings arranged with partly streamlined cross-section, which arm is fastened to a driven, rotating shaft, through which liquid can be added, the liquid flows through an opening in the shaft into a chamber in the lengthwise direction of the arm, which chamber is built with a mainly horizontal top part provided with orifices, which the orifices open into a plurality of nozzles which widen toward the back part of the arm in both the widthwise and heightwise direction where each nozzle is ended in a narrow opening of relatively great width and small height and where two adjacent nozzles have openings located close to each other, so that the whole back side of the arm is substantially made up of nozzle openings.

3,913,839
DUAL SHOWER ATTACHMENT DEVICE

Mark L. Wilson, 650 Wren Ave., Miami Springs, Fla. 33166

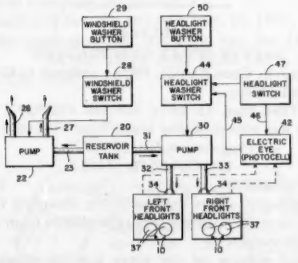
Filed Jan. 23, 1975, Ser. No. 543,251
Int. Cl.² B05B 15/06, 1/30
U.S. Cl. 239—267 9 Claims

1. A dual shower head attachment device comprising, in combination, a sectional tubular support structure, said structure comprising a plurality of central tubular support member sections, means for removably interconnecting said central tubular support member sections in coaxial alignment, a shower head fitting inter-fittingly connectable at each end of said interconnected central tubular support sections, said cylindrical shower head fittings each comprising a cylindrical body portion and means for interconnecting one end each of said cylindrical body portions in coaxial alignment with the opposed outer end portions of said interconnected tubular support member sections, a tubular end member extending coaxially outwardly of each of the other ends of said shower head fitting body portions, means for removably securing said end members to their respective shower head fittings, means for adjustably extending the length of one of said end members for varying the overall length of said tubular support structure, said shower head fittings each comprising a shower head nipple portion and a second nipple portion both of which extend sidewardly outwardly of said cylindrical body portion, said shower head fittings each further comprising a third nipple portion extending coaxially outwardly of said one end of its respective cylindrical body portion, passageway means within each of said shower head fitting members intercommunicating with the ports of said associated shower head nipple portion and said second and third nipple portions, and a flexible conduit removably secured between said third coaxial nipple portions of each of said shower head fittings and receivable within said interconnected central tubular support member sections for conducting water between said passageway means of said shower head fittings.

3,913,840
HEADLIGHT CLEANER FOR VEHICLES

Mikio Kato, La Vale, Md., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 26, 1974, Ser. No. 483,101
Int. Cl.² B05B 1/10; B60S 1/46
U.S. Cl. 239—284 6 Claims

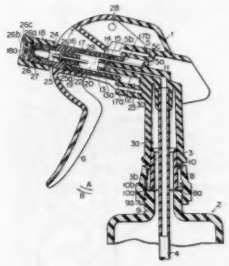


1. A headlight cleaner for a motor vehicle, which comprises:
a. a reservoir tank adapted to be received within a motor vehicle having a plurality of sealed beam headlights therein, said reservoir tank adapted to receive a cleaning solution therein;
b. a pump adapted to be received in said motor vehicle;
c. a duct joining said pump to said reservior tank in a fluid serial connection;
d. a distribution header mounted behind each said headlight;
e. a plurality of delivery tubes joining said pump to each said distribution header;
f. a plurality of spray delivery tubes extending outwardly angularly from each said distribution header to a front end of each said headlight; and
g. a spray nozzle joined to an outer end of each said delivery tube, said spray nozzles aimed directly onto the lenses of each said headlight from the outer peripheries of each said lense towards a center of each said lense.

3,913,841
SPRAYER

Tetsuya Tada, 1339 Nishitakadomari, Onoda, Yamaguchi, Japan

Filed Sept. 9, 1974, Ser. No. 504,287
Claims priority, application Japan, Dec. 12, 1973, 48-142124
Int. Cl.² B05B 9/043, 7/10
U.S. Cl. 239—321 8 Claims



1. A sprayer comprising a sprayer body having at one end a suction pipe and at the other end a cylinder communicating with the suction pipe and having an open end and closed end; a cylindrical projection mounted on the closed end of the cylinder in a manner to extend toward the open end of the cylinder, and communicating with the suction pipe; a first valve disposed within the spray body to permit a flow of liquid from the suction pipe; a piston slidably movable along the inner surface of the cylinder and surrounding the cylindrical projection, said piston including a cap member mounted at the forward end portion of the cylinder and having a nozzle, and a liquid chamber defined therein to permit the liquid to flow through the first valve, said liquid chamber being so dimensioned that when the piston is moved in closest proximity to the closed end of the cylinder the cylindrical projection makes the volume of the liquid chamber minimal; and a second valve disposed within the piston to allow the liquid to flow from the liquid chamber toward the nozzle.

3,913,842
SPRAY HEAD FOR AEROSOL CAN

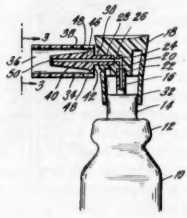
Arnold J. Singer, South Orange, N.J., assignor to Block Drug Company, Inc., Jersey City, N.J.

Filed Dec. 14, 1973, Ser. No. 424,750
Int. Cl.² B05B 01/28
U.S. Cl. 239—337 2 Claims

1. In combination, a container, a valve disposed in the container and including a valve stem communicating with the valve and projecting through the container for relative movement therein to operate the valve, a cap having a bore means

adapted to seat on the stem and be communicative therewith, a directional spray head for insertion into an orifice and projecting from the cap and adapted to detachable seat therein, the spray head comprising a hollow delivery conduit having one open end, nozzle means disposed within the conduit, the nozzle means extending within the interior of the conduit and having one end terminating in a discharge opening spaced inwardly from the conduit open end to prevent the nozzle from contacting the orifice and to prevent the spray from striking the interior wall of said spray head, the other end of the nozzle means flaring outwardly to merge with and close the other end of the conduit, a projection extending outwardly from the conduit closed end in a direction opposite the nozzle means, the protrusion adapted to detachably seat in a portion of the bore means, and aperture means disposed in the wall of the spray head and adjacent the rear end thereof so as to vent the interior thereof to the atmosphere whereby a depression of the cap will move the valve stem to cause the aerosol to be propelled therethrough as the bore means guides the resulting aerosol flow into the nozzle means so that the last mentioned means will egress the resulting aerosol near the conduit open end as the aperture means vents any pressure rise in the spray head interior to the atmosphere.

2. Spray head apparatus for a container housing having material being dispensed and having valve means for controlling the flow therethrough including in combination:



a cap having bore means disposed therethrough and adapted to be coupled to and communicate with said valve means;

a hollow delivery tube for insertion into an orifice and having two opposed ends one of which is open, and

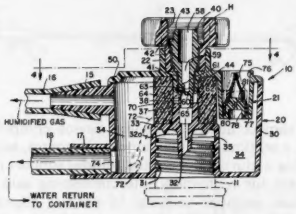
nozzle means comprising a hollow projection adapted to detachably seat in said cap and communicate with said bore means and an extending nozzle that includes a discharge orifice, said extending nozzle being disposed in said tube so as to position the discharge orifice spaced from said tube open end whereby a depression of said cap causes a spray of the dispensed mixture to traverse said bore and nozzle means and egress through the discharge orifice and said tube open end;

the exit opening of said nozzle being positioned inwardly from the open end of said delivery tube to prevent contact with the orifice, the spacing between said exit opening and the open end of said delivery tube being chosen to prevent the spray from striking the interior of the delivery tube; said extending nozzle having a rearward portion adapted to merge with said tube and close the other one of said opposed ends thereof; the rearward portion of said tube including aperture means to vent the interior of said tube to the atmosphere.

3,913,843
HUMIDIFIER

Orlando D. Cambio, Jr., Bristol, Wis., assignor to Respiratory Care, Inc., Arlington Heights, Ill.

Filed Oct. 30, 1974, Ser. No. 519,239
Int. Cl.² B05B 7/30
U.S. Cl. 239—338 **16 Claims**



1. A humidifier device particularly adapted for use in an inhalation therapy system, and adapted to be connected to both a source of liquid and also to a pressurized gas stream, and having means for channeling and directing a humidified gas stream issuing therefrom to a predetermined use, said humidifier device comprising in combination:

a. venturi means including an insert body carried in said deivce and having a generally vertical upper main flow channel and a transverse venturi channel generally perpendicular to said main flow channel; said venturi channel having an exit port in said insert body communicating downstream thereof with said means for channeling and directing the humidified gas stream to a predetermined use; said venturi channel also having an intermediate port connecting said venturi channel with a generally vertical lower channel or conduit at least operatively connected with said insert body;

b. means for connecting said main flow channel to said pressurized gas stream;

c. means for connecting said lower vertical channel of said insert body to said liquid source, whereby the flow of gas down through said upper main flow channel and through said venturi channel creates a suction on said intermediate port thereof such that droplets of said liquid are drawn through said generally vertical lower channel and are aspiratively carried by said gas exiting said venturi channel;

d. foraminous means spaced adjacent from said venturi exit port for filtering out said droplets while permitting the flow of gas therethrough so that essentially only a liquid vapor passing from said foraminous means is carried in the gas stream exiting therefrom and directed via said channeled gas stream to said predetermined use.

3,913,844
SAFETY SPRAY GUN TRIGGER

John E. Petrovic, Coon Rapids, Minn., assignor to Graco Inc., Minneapolis, Minn.

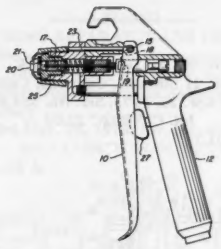
Filed Mar. 13, 1974, Ser. No. 450,927
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B05B 11/00
U.S. Cl. 239—526 **12 Claims**

6. A spray gun safety apparatus for disabling the spray gun trigger on removal of the spray tip retainer from the spray gun housing comprising:

a threaded portion on the spray gun for accepting and securing said spray tip and spray tip retainer;

a pivot pin contacting said trigger with the spray gun housing;

a slotted passage in said spray gun housing for accepting said pivot pin; and



a slidable rod extending between said slotted passage and said spray tip retainer to hold said pivot pin in an actuating position when said tip retainer is secured.

3,913,845

MULTIHOLE FUEL INJECTION NOZZLE

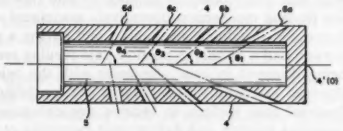
Shoichi Tsuji, Hoya, Japan, assignor to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1973, Ser. No. 405,558

Claims priority, application Japan, Dec. 31, 1972, 48-3342; Dec. 31, 1972, 48-3343

Int. Cl.² B05B *1/02, 1/14, 7/08*

U.S. Cl. 239—556 **2 Claims**



1. A fuel injection nozzle comprising a hollow elongated cylindrical head, said head having one open end and one closed end and at least one row of longitudinally spaced discharge openings extending through its wall, each of said openings extending at an angle to the axis of said head, with the angles decreasing in proportion to the respective distances of said openings from said open end, and means registering with said open end for supplying a combustible fuel to said hollow portion for discharge through said openings.

3,913,846

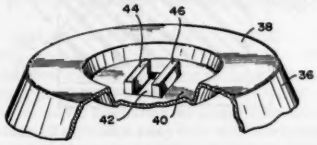
GAS BURNER ORIFICE

Louis P. Morris, Garden Grove, Calif., assignor to Robertshaw Controls Company, Richmond, Va.

Continuation of Ser. No. 201,012, Nov. 22, 1971, abandoned. This application Jan. 21, 1974, Ser. No. 435,628

Int. Cl.² B05B *1/00;* **F23D** *13/26*

U.S. Cl. 239—597 **3 Claims**



1. An orifice device for gas burner apparatus comprising a generally hollow body having opposite end portions,

an inlet in one end portion adapted to receive a flow of gas,

a wall having a generally rectangular orifice in the other end portion for discharging a flow of gas therefrom,

a pair of projecting tabs integrally formed with the wall,

said projecting tabs being located on opposite sides of said rectangular orifice with each tab being contiguously aligned with its corresponding side causing turbulence of the gas flow being discharged from said rectangular orifice, and

said projecting tabs extending transversely from the wall in a direction away from said wall and being downstream of said orifice for controlling the gas flow being discharged from said rectangular orifice in order to enhance air mixture therewith.

3,913,847

GRANULATOR

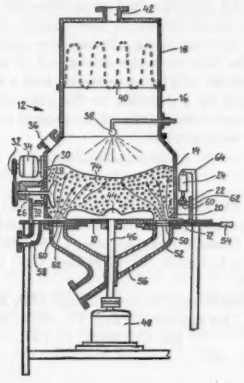
Werner Glatt, Haltingen, and Harm Siemer, Warendorf, both of Germany, assignors to Werner Glatt, Haltingen, Germany

Filed Apr. 5, 1974, Ser. No. 458,428

Claims priority, application Germany, Apr. 5, 1973, 2317129

Int. Cl.² B02C *23/26*

U.S. Cl. 241—46.04 **7 Claims**



1. A granulator comprising

a container having a bell-shaped, downward-open container upper part and a bottom plate beneath the opening under said container upper part,

a stirrer arranged above said bottom plate,

lifting means to lift said container upper part from said bottom plate,

a gas outlet in the upper portion of said container,

means to supply gas to said container including an annular gas-entry gap of adjustable cross-section formed between a lower-edge region of said container upper part and said bottom plate when said container upper part is lifted by said lifting means and which said gap is closed when said container upper part is lowered by said lifting means,

and a spraying device within said container.

3,913,848

PROCESS AND MEANS FOR COOLING CEMENT

Heinz Jager, Bochum, Germany, assignor to Westfalia Dinnendahl Groppel AG, Bochum, Germany

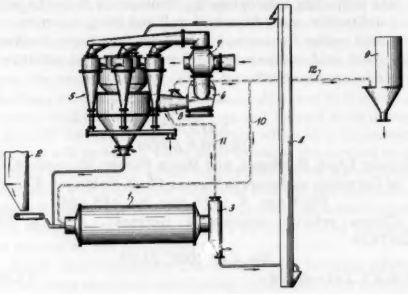
Continuation of Ser. No. 144,816, May 19, 1971, abandoned. This application Aug. 3, 1973, Ser. No. 385,453

Int. Cl.² B02C *11/08*

U.S. Cl. 241—54 **1 Claim**

1. Means for cooling hot cement clinker comprising a closed circuit having an air separator, an external fan for

circulating the separator air and a cooler between the air separator and the fan in the air separator circuit to cool the separator air indirectly, a pressure line connecting and affording communication between the fan and the air separator and a line connecting and affording communication between the cooler and the air separator, and including means for passing a portion of the cooled separator air through the intake end of an associated mill and back to the air separator, a line



connecting the pressure line to a filter for eliminating air entering the closed circuit by unavoidable infiltration and a branch line connecting an intermediate portion of the line leading to the filter with the intake end of the mill, the discharge end of the mill being provided with a discharge chamber connected by a pipeline to the pressure line and to a bucket conveyor which delivers the ground cement clinker as feed for the air separator.

3,913,849

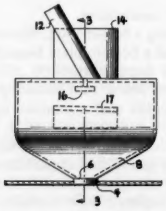
FLUORESCENT TUBE DIGESTER

Irving M. Atanasoff, 1002 W. 7th St., Frederick, Md. 21701; Russell J. Gosnell, Box 143, Rte. 1, Woodbine, Md. 21797, and Jimmie L. Smith, No. 12 Hidden Glen Circle, Erlanger, Ky. 41018

Continuation-in-part of Ser. No. 265,199, June 22, 1972, abandoned. This application Jan. 17, 1974, Ser. No. 434,130

Int. Cl.² B02C *19/14*

U.S. Cl. 241—55 **5 Claims**



1. A digester for fluorescent light bulbs comprising a container having a cover, a cylindrical portion and a tube extending upwardly from the cover and opening therethrough into the cylindrical portion of the container at a point adjacent the wall of the container, a blade mounted to rotate about a vertical axis within the container substantially centrally thereof and slightly below the cover in a circular path at least partly overlapping the tube opening, said blade including means to produce a downward current of air within the container towards the outlet whereby to prevent upward movement of materials disintegrated by the blade, the axis of the tube lying in a plane tangential to the axis of rotation of the blade and sloping downwardly in the direction of the axis of rotation, the axis of the tube being spaced from the wall of the cylindrical portion by a distance not greater than twice the diameter of the tube, the leading edge of the blade sloping backwardly with respect to the direction of rotation from the inner end to the outer end.

3,913,850

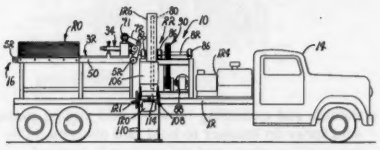
MOBILE TIRE SHREDDER

William E. Daniel, 21 5th Ave., Corcoran, Calif. 93212

Filed Apr. 26, 1973, Ser. No. 354,493

Int. Cl.² B02C *21/02*

U.S. Cl. 241—101.7 **12 Claims**



1. A tire shredder comprising:

a frame mounted on a mobile chassis;

a shredding mechanism mounted on said frame and disposed to shred tire carcasses, said shredding mechanism including a flywheel rotatably mounted in said frame and disposed generally vertically in said frame, said flywheel being rotatable about a flywheel axis and having a face surface disposed normal to said flywheel axis, a rotary blade mounted on said face surface of said flywheel and having a cutting edge disposed radially with respect to said flywheel axis, and a fixed blade mounted adjacent said flywheel and disposed to pass in shearing relationship with said rotary blade on rotation of said flywheel;

a tire feeding mechanism operatively associated with said frame and shredding mechanism and having a receiving portion and a discharge portion, said feeding mechanism being disposed in axial alignment with the axis of said flywheel and with said discharge portion adjacent said flywheel face surface to receive tire carcasses at said receiving portion and deliver said carcasses at said discharge portion to said shredding mechanism; and

a shred handling mechanism operatively associated with said frame and interconnected with said shredding mechanism to receive and dump shreds passing out of said shredding mechanism.

3,913,851

WEAR RESISTANT LINING FOR GRINDING MILLS

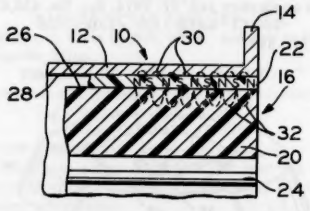
Sven E. Andersson, Chagrin Falls, Ohio, assignor to Trelleborg Rubber Company, Inc., Solon, Ohio

Filed Feb. 11, 1974, Ser. No. 441,416

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B02C *17/22*

U.S. Cl. 241—300 **16 Claims**



1. A lining for an abrasive material handling device having surface means of magnetic material comprising, a layer of wear resistant resilient material, and permanent magnet

means attached to said layer for releasably retaining said lining on said surface means by magnetic attraction.

3,913,852

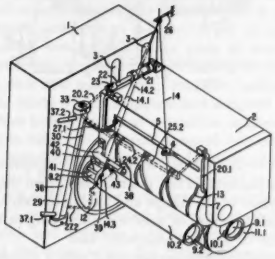
WINDING APPARATUS AND PROCESS

Erich Lenk; Herbert Turk, both of Remscheid, and Herbert Schiminski, Huckeswagen, all of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Mar. 29, 1974, Ser. No. 456,222

Int. Cl.[2] B65H *54/06, 67/04*

U.S. Cl. 242—18 A **20 Claims**



1. In a process for the loss-free winding of a continuously supplied thread into bobbin windings at a high winding speed, in which the thread is wound with traverse motion on a winding carrier into a bobbin winding, wherein after reaching a predetermined bobbin winding size or after a predetermined winding time, the wound bobbin is replaced, without interruption of the winding process, by an empty tube for receiving the supplied thread, in which, before the transfer of the thread from an almost wound bobbin to an empty tube or to a rotatable chuck carrying the empty tube, said bobbin and said tube are turned by a bobbin revolver into a position in which the almost wound bobbin remains driven on the periphery by a friction drive roller and the empty tube is brought to about the peripheral speed of the almost wound bobbin by contact with said roller, the improvement comprising guiding the thread in traverse motion by running it through an endless thread guide groove in the cylindrical surface of the friction roller during the acceleration of the empty tube to the peripheral velocity of the friction drive roller while winding the thread on said almost wound bobbin, guiding the thread during this bobbin exchange into a defined position, and drawing out the thread running onto the almost wound bobbin by controlled thread guide means into a thread loop in such a way that the thread comes into a zone of action of a thread catching means on the rotating empty tube or on the rotating chuck carrying the empty tube and is caught.

3,913,853

AUTOMATIC WINDING MACHINE

Hans Raasch, Rheydt, Germany, assignor to W. Schlafhorst & Co., Maschinenfabrik, Monchen-Gladbach, Germany

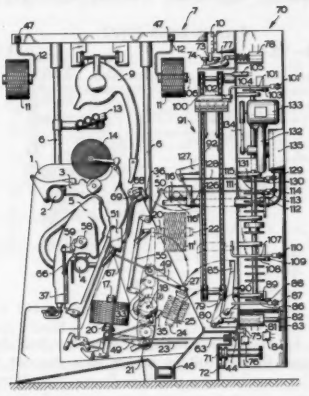
Filed June 25, 1973, Ser. No. 373,081

Claims priority, application Germany, June 23, 1972, 2230801

Int. Cl.[2] B65H *54/20, 54/22, 67/02*

U.S. Cl. 242—35.5 R **9 Claims**

1. In an automatic winding machine for large-volume supply coils having a plurality of winding stations, each of said stations having means for unwinding the supply coils, a transporting device located a distance away from said unwinding means and positioned relative to said winding stations to deliever said coils to respective winding stations of the machine, a coil loading carriage drivable past the unwinding means, said coil loading carriage comprising conveyor means movable alternatively into respective positions adjacent said unwinding means and said transporting device and transferring the coils to the



coil unwinding means of the respective stations, said coil unwinding means having make-ready means for readying supply coils to immediately continue the unwinding operation.

3,913,854

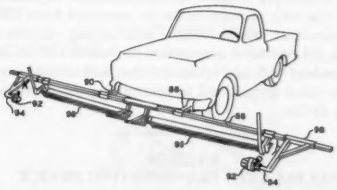
TENSIONED UNROLLING DEVICE FOR FABRIC ROLLS

Herman W. McClure, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 2, 1974, Ser. No. 466,309

Int. Cl. B65h *23/16, 17/02*

U.S. Cl. 242—75.4 **5 Claims**



3. A roll mounting and dispensing device for use in unrolling rolls under controlled tension comprising support means having demountably attached thereto a pair of roll supporting units so adapted as to be inserted in the opposite ends of the core of said roll, each of said supporting units comprising a rotatable insert presenting an outer surface engageable by the core of said roll, a non-rotatable spindle supporting said insert, and friction braking means in braking relation between said insert and said spindle to prevent free spinning of said insert and a fabric roll supported thereby, wherein the braking force on each of said roll supporting units is independently adjustable.

3,913,855
DEVICE FOR CONTROLLING THE TENSION IN A WEB OF MATERIAL BEING UNWOUND FROM A ROLL

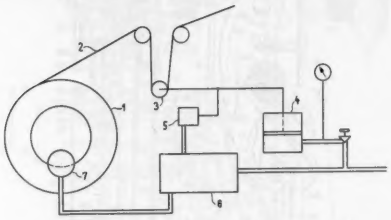
Paul Heimlicher, Bolligen; Jean Rohrer, Bern, and Willy Scharer, Papiermuhle, all of Switzerland, assignors to Maschinenfabrik Wifag, Bern, Switzerland

Filed Sept. 11, 1973, Ser. No. 396,316

Claims priority, application Sweden, Sept. 11, 1972, 11695/72

Int. Cl. B65h *25/22*

U.S. Cl. 242—75.43 **11 Claims**



1. Device for controlling the tension in a web of material being unwound from a roll by means of a pay-out control braking action, comprising a machine frame, a shaft mounted in said frame, a bracket mounted on said shaft, a rotatable journal mounted in said bracket and arranged to be inserted into and to rotate with the roll of material to be unwound and a pendulum roll positioned in the path of the web of material as it is unwound from the roll with the web passing over and in contact with a portion of the surface of said pendulum roller, wherein the improvement comprises a control system connected to said pendulum roller, said control system comprises a control value transmitter in communication with said pendulum roller for establishing the tension in the web passing over said roller, an operating value monitor in communication with said pendulum roller for measuring any deviations of the tension in the web from the tension value set in said transmitter, a regulating device in communication with said control value transmitter and said operating value transmitter for receiving signals therefrom, a brake member secured to said journal, a plurality of separate setting members each disposed in communication with said regulating device and each arranged to be operatively associated with said brake member at a different value transmitted from said regulating device for providing a multiple effect braking action for regulating the tension in the web of material to be unwound from the roll, and countereffect means within said setting members for restraining the operative association at least of certain of said setting members with said brake member and acting in opposition to the value transmitted to said setting members by said regulating device.

3,913,856
ENDLESS TAPE TRANSPORTING DEVICE

Satoshi Hara, Kanagawa; Morio Akino, Fujisawa, and Keizo Nakagawa, Chigasaki, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Sept. 18, 1973, Ser. No. 398,394

Claims priority, application Japan, Sept. 22, 1972, 47-95590

Int. Cl.² G11B *23/08;* **B65H** *17/48*

U.S. Cl. 242—55.19 A **3 Claims**

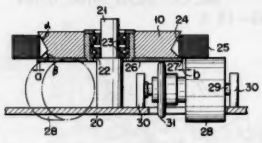
1. (Amended). A device for transporting an endless tape comprising:

means for transporting said tape at a speed of more than 3 m/sec;

a supporting rod;

a reel rotatably mounted upon said rod and having within its peripheral side surface an annular groove V-shaped in cross-section, said reel holding said tape within said peripheral side in the form of a laminated coil so as to permit said tape to be wound upon the outer most portion of said coil and delivered from the inner most portion thereof through said annular groove;

supporting means for supporting the lower side portion of said laminated coil, said supporting means including a flange fixed to said reel and projecting radially from the lower side peripheral edge of said reel for a distance of



from 0.5 — 2.0 mm and at least one supporting roll being spaced a distance of less than 2.0 mm from the peripheral edge portion of the flange and having its axis extending in the radial direction of said reel and being in the form of a cylinder of uniform diameter; and

said supporting roll being provided with a transmission roll having its periphery engaging the lower side surface of the reel so as to rotate said supporting roll at a speed not greater than the tape traveling speed.

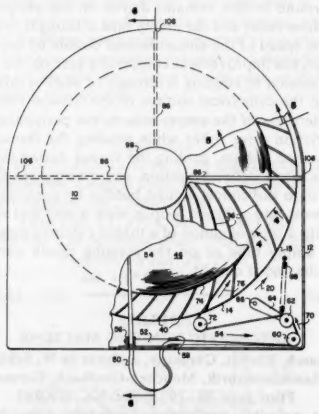
3,913,857
LONG PLAY FILM CARTRIDGE

Richard James Threlkeld, 6736 Tobias, Van Nuys, Calif. 91405

Filed Aug. 2, 1974, Ser. No. 494,230

Int. Cl.² G11B *23/10;* **G03B** *23/02, 21/00*

U.S. Cl. 242—55.19 A **6 Claims**



1. In a continuous long play projector cartridge, the combination of: a base cartridge housing structure; a cover for said base housing structure; a film holding rotor rotatably mounted in close proximity to said base housing and disposed beneath said cover; said film holding rotor being generally circular and rotatable about a substantially vertical axis of rotation; said rotor having a peripheral portion; drive means on said rotor adapted for rotatably driving said film holding rotor relative to said base housing structure and said cover; said film holding rotor having a generally disc-shaped upper side adapted to hold an endless spiral roll of film thereon; said disc-shaped

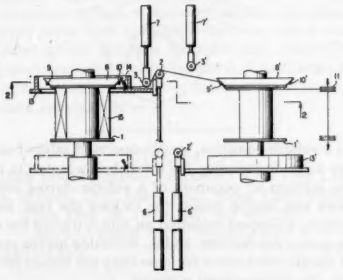
upper side of said film holding rotor having a centrally located upstanding generally annular hub; said upper side of said rotor having a generally circular array of film holding ribs; each rib being of a generally spiral shape and each of said ribs having an inner end directed towards said hub; each of said ribs extending in a direction away from said hub and outwardly in a generally spiral direction toward said peripheral portion of said film holding rotor; said ribs having upper edges declined relative to the horizontal in a direction toward said hub of said film holding rotor; first film elevating means disposed adjacent said hub; said elevating means having film engaging surface portions spaced above said ribs and above said spiral roll of film thereon; said film engaging surface portions disposed and adapted to lift said film above said spiral roll in closely adjacent relation to said hub; said film holding rotor having a direction of rotation about said axis of rotation; outer ends of said ribs being adjacent to said periphery of said rotor and spirally trailing behind said inner ends of said ribs in said direction of rotation; said cartridge having second film guide means adjacent said periphery of said film holding rotor; said second film guide means disposed and adapted to guide film onto said film holding rotor at a location substantially spaced radially from said hub thereof; a spiral roll of film on said rotor; said spiral roll of film comprising spiral convolutions, said spiral roll having a periphery disposed at said location; said spiral roll of film being a continuous and endless loop and comprising a projector related film portion disposed outside said cartridge and between said first and second film guide means; said film being a thin, flat, flexible film having opposite edges and opposite sides; said opposite sides being contiguous in said spiral roll on said film holding rotor.

3,913,858

APPARATUS FOR DISPOSING OF A WIRE TERMINAL IN A WIRE WINDING MACHINE

Yoshio Ikegami, Kobe, Japan, assignor to Kobe Steel, Ltd., Kobe, Japan

Filed Dec. 28, 1973, Ser. No. 429,690
Claims priority, application Japan, Dec. 28, 1972, 48-4794
Int. Cl.² B65H *67/04*
U.S. Cl. 242—25 A **7 Claims**



1. Apparatus for disposing of a wire end terminal within a wire winding machine which continuously winds a wire by alternately utilizing two bobbins rotatably disposed in parallel fashion and having a plurality of wire shifting rods interposed between said bobbins, comprising:

said wire shifting rods being extendable and retractable in a direction parallel to the rotational axes of said bobbins;

cover means for each of said bobbins for covering one end of each of said bobbins which is attached to one of said wire shifting rods and which has a slit means provided therein for permitting said wire being wound to enter the vicinity of said bobbin being wound; and

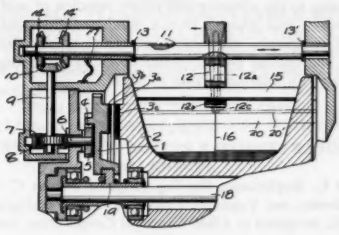
a cutter attached to each of said cover means for cutting said wire end terminal into chips.

3,913,859

FISHING LINE GUIDE DEVICE

Toshiaki Miyamae, 16, 2-Ban, 2-Chome, Nishi-Iwata, Higashi-Osaka, Osaka, Japan

Filed Aug. 30, 1973, Ser. No. 393,064
Claims priority, application Japan, Sept. 21, 1972, 47-110714
Int. Cl.² A01K *89/04*
U.S. Cl. 242—84.41 **3 Claims**



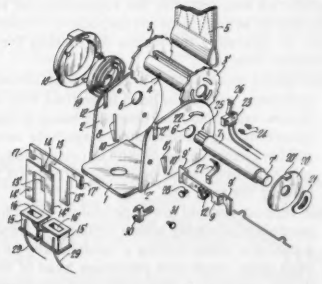
2. A fishing line guide device, as set forth in claim 1, wherein a fixed guide shaft is mounted in parallel relation with and spaced from said threaded shaft, said guide member having a hole therethrough with said fixed guide shaft extending through the hole so that as the guide member moves along the threaded shaft it is slidingly guided along said fixed guide shaft, a sliding rod mounted in parallel relation with said threaded shaft and positioned on the opposite side of said threaded shaft from said fixed guide shaft, said sliding rod having a groove formed in its surface and extending in its axial direction, said guide member supported at one end in said groove in said sliding rod, and said guide member having a slot therein extending transversely of the axial direction of said sliding rod and located in the end of said guide member adjacent said sliding rod and the fishing line being arranged to pass through said slot as it moves to and from said spool.

3,913,860

VEHICLE SAFETY BELT EMERGENCY LOCKING RETRACTION REEL SYSTEM

Takezo Takada, deceased, late of Tokyo, Japan (by Juichiro Takada, legal authorized heir), assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Filed Mar. 1, 1974, Ser. No. 447,445
Claims priority, application Japan, Mar. 3, 1973, 48-026291
Int. Cl. A62b *35/00*
U.S. Cl. 242—107.4 **8 Claims**



1. A vehicle safety belt retractor system comprising a reel rotatable in a belt withdrawal advance direction and a belt retraction return direction and spring biased to rotate in a

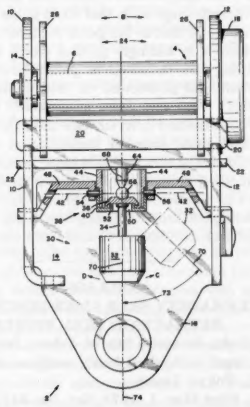
return direction, a braking member movable between an advanced position braking said reel against advance rotation and a retracted position releasing said reel and spring biased to its advanced position, means responsive to at least a predetermined amount of belt wound in said reel for retracting said braking member, a solenoid, means responsive to the energization of said solenoid for retracting said braking member, first switch means including an inertia switch transferrable between first and second states in response to the actuation and deactuation of said inertia switch, a second switch means responsive to the advance and return rotation of said reel for transferring said second switch means to first and second states respectively, and means responsive to said first switch means and second switch means concurrently being in said first states for energizing said solenoid.

3,913,861

VEHICLE SENSITIVE RETRACTOR WITH DOUBLE PENDULUM

Robert L. Stephenson, Sterling Heights; Robert C. Pfeiffer, Rochester, and Yogendra Singh Loomba, Washington, all of Mich., assignors to Allied Chemical Corporation, New York, N.Y.

Filed July 10, 1974, Ser. No. 487,329
Int. Cl.² B65H 75/48
U.S. Cl. 242—107.4 **6 Claims**



1. In a vehicle-sensitive, inertia operated safety belt retractor having a reel for winding a safety belt, means to lock the reel and thereby restrain an occupant of the vehicle during dangerous situations, an inertia mechanism, a support mounted on said retractor for supporting the inertia mechanism, and an actuating means responsive to said inertia mechanism for operating the means for locking the reel; the improvement wherein:

said inertia mechanism is a lower pendulum assembly which includes a pendulum head in contact with said actuating means, said pendulum assembly being actuated by forces exceeding a predetermined magnitude resulting from a sudden change in the motion or orientation of the vehicle, said actuation means operating directly on the means for locking the reel; and

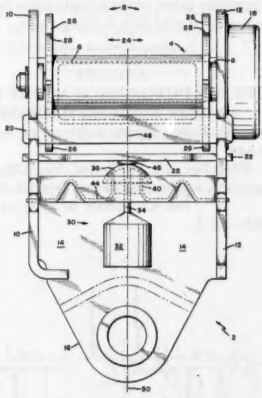
said support for said lower pendulum assembly is an upper pendulum assembly which includes: a trunnion which is a concave vessel having a substantially circular support edge upon which said pendulum head of said lower pendulum assembly is disposed, said lower pendulum assembly requiring a force exceeding a predetermined magnitude to lift a part of the pendulum head up and off a part of said support edge before said lower pendulum assembly will cause said locking means to lock the reel, said trunnion and said lower pendulum assembly being adapted to pivot in one plane to a variety of operable static positions to which said trunnion and said lower pendulum assembly are adjustable according to the position in which the retractor is oriented by virtue of installation in the vehicles; a swivel axis for said trunnion adapted to allow said trunnion to pivot in one plane; and a support member for said trunnion; upon actuation by forces resulting from a sudden change in the motion or orientation of the vehicle said trunnion and said lower pendulum assembly having independent action and pivoting in opposite directions; said lower pendulum assembly and said support having a compact configuration, sufficiently compact for said lower pendulum assembly and said support to be mounted either within said retractor or outside said retractor.

3,913,862

VEHICLE SENSITIVE RETRACTOR WITH UNIVERSAL DOME PENDULUM

Robert L. Stephenson, Sterling Heights; Robert C. Pfeiffer, Rochester, and Yogendra Singh Loomba, Washington, all of Mich., assignors to Allied Chemical Corporation, New York, N.Y.

Filed July 10, 1974, Ser. No. 487,430
Int. Cl.² A62B 35/00
U.S. Cl. 242—107.4 **5 Claims**



1. In a vehicle-sensitive, inertia-operated safety belt retractor with a reel for winding the safety belt adapted to lock and thereby restrain an occupant of a vehicle during emergency situations and having means for locking the reel, an inertia mechanism, a support mounted on said retractor for supporting the inertia mechanism, and an actuating means responsive to said inertia mechanism for operating the means for locking the reel, the improvement wherein:

said inertia mechanism is a pendulum assembly which includes a pendulum dome in contact with said actuating means, said pendulum assembly having an infinite variety of operable static positions to which said pendulum assembly is adjustable according to the position in which the retractor is oriented by virtue of installation in the vehicle; said pendulum assembly being actuated by forces exceeding a predetermined magnitude resulting from a sudden change in the motion or orientation of the vehicle; said support for said inertia mechanism includes a substantially cylindrical support member having substantially circular line of contact at its upper end upon which said pendulum dome is disposed, said pendulum assembly requiring a force exceeding a predetermined magnitude to lift a part of the pendulum dome up and off a part of

said support member before said pendulum assembly will cause said locking means to lock the reel; and

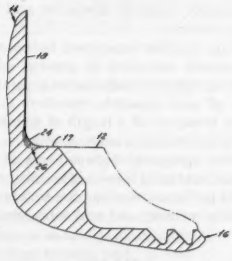
said actuating means is disposed above said pendulum dome, said actuating means having an unlocked position and a locked position, said actuating means being disposed in said unlocked position when said pendulum assembly is in any one of said infinite variety of said operable static positions, said actuating means being moved to said locked position by said pendulum assembly during emergency situations to lock said reel and prevent further unwinding of said belt, said actuation means operating directly on the means for locking the reel and said support assembly having a compact configuration, sufficiently compact for said pendulum assembly and said support for said inertia mechanism to be mounted either within said retractor or outside said retractor.

3,913,863

CAST ALUMINUM TEXTILE BEAM

Arthur S. O'Malley, Charlotte, N.C., assignor to Hayes Albion Corporation, Charlotte, N.C.

Filed Sept. 13, 1973, Ser. No. 397,085
Int. Cl.² B65H *75/14*
U.S. Cl. 242—118.62 **4 Claims**



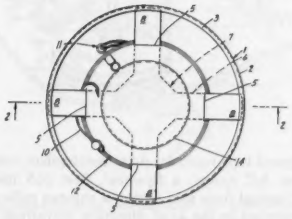
3. A head for a textile beam or spool, said head having a hub with a cylindrical surface, a retaining surface extending radially outward from said cylindrical surface, and a concave annular fillet at the junction between said cylindrical and retaining surfaces; wherein the material of said head is provided with a residual compressive stress which is localized at said concave annular fillet.

3,913,864

HOLDER FOR FISHING LEADERS AND THE LIKE

George A. Scriven, 2597 Imola Ave., Napa, Calif. 94558

Filed June 28, 1974, Ser. No. 484,252
Int. Cl.² B65H *75/28, 49/00, 49/18*
U.S. Cl. 242—125.2 **6 Claims**



4. A holder for a length of line or the like comprising:

a generally flat base,

a plurality of lugs carried by said base and arranged in a circular row and projecting radially outwardly of said row to form a reel around which said line may be wound,

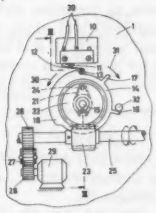
a planar member on the opposite side of said base from said lugs, said lugs constituting coplanar ends of extensions of said member, said base being formed with openings through which said extensions slidably extend.

3,913,865

APPARATUS FOR TRANSPORTING FLEXIBLE WEBS IN MOTION PICTURE PROJECTORS OR THE LIKE

Roberto Fabro, Turin, and Roberto Tolone, Rivoli Torinese, both of Italy, assignors to Robert Bosch Photokino GmbH, Stuttgart, Germany

Filed May 7, 1974, Ser. No. 467,649
Int. Cl.² B65H *59/38, 63/02*; G03B *1/04*; G11B *15/32*
U.S. Cl. 242—189 **21 Claims**



1. In an apparatus wherein a flexible web is transported forwardly and rearwardly, particularly in a motion picture projector or tape recorder, a combination comprising a rotary web supporting device; drive means operable to transport the web forwardly whereby said device rotates in a first direction to pay out the web and rearwardly whereby said device rotates in a second direction to collect the web, the tension of said web increasing when the supply of web on said device is substantially exhausted and temporarily due to inertia of said device while the direction of rotation thereof is changed from said second to said first direction, said drive means including an electric motor and switch means in circuit with said motor; means for monitoring said changes in tension and for normally arresting said motor by way of said switch means when said tension increases; and control means for preventing stoppage of said motor by way of said switch means while the web is transported rearwardly and during said temporary increase in tension of the web, said control means comprising means for maintaining said switch means is closed position while the web is transported rearwardly and during the first stage of subsequent forward transport of the web, said first stage of subsequent forward transport of the web taking place during said temporary increase in tension of the web.

3,913,866

CROSS COUPLED REELS SYSTEM

Frederick E. Hankins, Flemington, N.J., assignor to Lockheed Electronics Company, Inc., Plainfield, N.J.

Filed Nov. 1, 1973, Ser. No. 411,686
Int. Cl.² G11B *19/28*; B65H *25/22, 25/16*
U.S. Cl. 242—191 **5 Claims**

1. Apparatus for controlling tension in material which is fed from a supply reel or the like to a take-up reel, comprising:

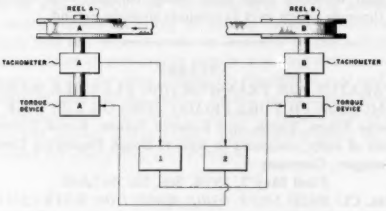
a first reel;

a second reel;

a shaft operatively associated with each reel for rotating the reel;

a tachometer mounted on the shaft of each reel for sensing the reel angular velocity;

a torque device mounted on the shaft of each reel for applying a torque load on the reel through said shaft;



means connecting the output of the tachometer of one reel to the torque device of the other reel so as to apply a torque load on said other reel which is directly proportional to the angular velocity of said one reel; and

capstan drive means for providing a constant linear velocity of the material from one reel to the other.

3,913,867

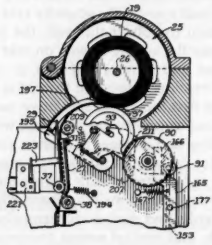
WEB HANDLING APPARATUS

Jack W. Thomsen, La Grange Park, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Division of Ser. No. 706,243, Feb. 19, 1968, which is a continuation of Ser. No. 550,308, May 16, 1966. This application Jan. 4, 1971, Ser. No. 103,539The portion of the term of this patent subsequent to Aug. 22, 1989, has been disclaimed.

Int. Cl.² G03B *1/04*; G11B *15/32*

U.S. Cl. 242—192 **2 Claims**



1. Web handling apparatus for a device having a web take-up and a double-flanged rotatable supply reel with a coiled web having a leading end carried thereon, comprising:

means for feeding the leading end of the web from the supply reel in one direction for transfer to the web take-up and for recoiling the web in the opposite direction for rewind of removed web onto the supply reel, said means operating during feed of the leading end of the web from the supply reel to frictionally engage the surface of the outer loop of the coiled web between the flanges of the supply reel to drive the leading end of the web in said one direction, said means operating during rewind of removed web onto the supply reel to frictionally engage at least one flange of the supply reel to recoil the web in said opposite direction by rotation of the supply reel; and

torque transmission means for selectively driving said first mentioned means.

3,913,868

TAPE TAKE-UP DEVICE

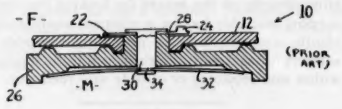
Yukio Katahira, Tokorozawa, and Seiichi Saito, Iruma, both of Japan, assignors to Nihon Beru-Haueru Kabushiki Kaisha, Higashimurayama, Japan

Filed Aug. 28, 1974, Ser. No. 501,396

Claims priority, application Japan, Aug. 28, 1973, 48-100769

Int. Cl.² G03B *1/04*; G11B *15/32*; F16D *17/02*

U.S. Cl. 242—201 **5 Claims**



1. In a take-up assembly for an apparatus handling an elongated web to be wound from a controlled transport onto a take-up by a continuously driven take-up assembly, the improvement comprising:

a rotating driving means;

a first rotatable member driven by said driving means;

means biasing said first rotatable member into frictional engagement with said driving means;

a second rotatable member driven by said first rotatable member by friction;

a solid lubricant member interposed between said first and second rotatable members to prevent stick-slip action from occuring between said relatively rotatable members when one of said rotatable members is restrained or released by transport of a length of web to said take-up assembly by controlled transport, and

a metal washer interposed between one of said rotatable members and said solid lubricant member to reduce wear of said solid lubricant member due to relative rotation of said rotatable member and said solid lubricant member.

3,913,869

SLOW-SPEED TAPE RECORDER DRIVE MECHANISM

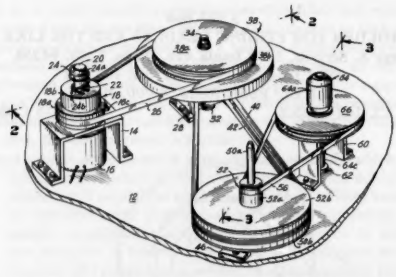
William D. Richards, Medway, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Sept. 10, 1973, Ser. No. 396,025

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G03B *1/04*; G11B *15/32*

U.S. Cl. 242—206 **8 Claims**



1. A slow-speed tape recorder drive mechanism comprising a synchronous AC motor, a flywheel, first belt means for driving said flywheel from said motor, a capstan pulley having a capstan extending in the axial direction therefrom, second belt means for driving said capstan pulley from said flywheel, a take-up pulley having a take-up spindle extending in the axial direction therefrom, and means including at least one

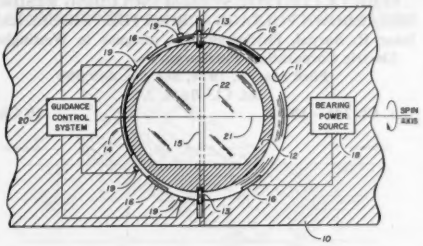
additional belt means for driving said take-up pulley from said flywheel, said first and second belt means being operative to control the surface speed of said capstan to be less than one inch per second and the inertia of the flywheel to be at least 25 times as great as the inertia of said capstan pulley and capstan at the operating speed of the drive mechanism.

3,913,870

STABLE GYRO REFERENCE FOR PROJECTILES

R. Glenn Bolick, Fredericksburg, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 5, 1973, Ser. No. 322,803
Int. Cl.² F42B *15/14*
U.S. Cl. 244—3.2 **8 Claims**



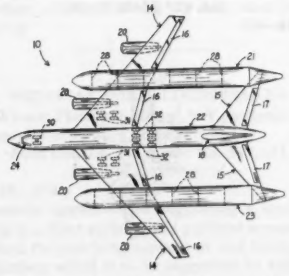
1. A stable gyro reference for spin-stabilized projectiles comprising:
a projectile body;
a gyro disposed within a cavity in said projectile body;
means for releasably coupling said gyro to said projectile body during launch whereby the stabilizing spin of the projectile will be imparted to said gyro, said coupling means allowing said gyro to spin freely following launch;
bearing means on said projectile body for supporting said gyro following release; and
means responsive to the relative orientation of said projectile body and said gyro for generating error signals to enable correction of the trajectory when necessary.

3,913,871

HEAVIER-THAN-AIR PASSENGER AIRCRAFT

Ralph H. Miller, 13619 Sunset, Detroit, Mich. 48212

Filed May 2, 1974, Ser. No. 466,417
Int. Cl.² B64B *1/20*
U.S. Cl. 244—5 **2 Claims**



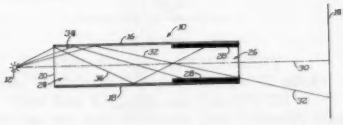
1. Improvement in heavier-than-air passenger aircraft having forward thrust means, wing means, rear fin and rudder means, and lighter-than-air gas lift means for enhancing the aerodynamic lift provided by said forward thrust means and wing means, said improvement comprising respective forward and rear wing means, two equally widthwise spaced apart gas compartment means containing lighter-than-air gas disposed vertically above said forward wing means, a passenger compartment means having a pilot compartment at the front end thereof, said passenger compartment means disposed vertically above said forward wing means and transversely centrally between said gas compartment means, said forward and rear wing means and said three compartment means joined to each other to provide framing rigidity for said aircraft, said rear fin and rudder means mounted upon said passenger compartment means so as to upstand vertically therefrom to obtain a clear aerodynamic cut into the air, each said compartment means of substantially uniform transverse cross-section, each said compartment means extending axially substantially full length of said aircraft, said rear wing means being a substantially full width rear wing disposed vertically above said forward wing means so as to have a substantially clear aerodynamic cut into the air.

3,913,872

LIGHT TUNNEL FOR UNIFORMLY ILLUMINATING AN OBJECT

Paul Egon Weber, Libertyville, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Jan. 18, 1973, Ser. No. 324,703
Int. Cl.² F21M *1/00*; G03B *27/54*
U.S. Cl. 240—41 R **2 Claims**



2. A device for illuminating an elongated area of an object disposed at an illumination station whereby the integral of light in every plane parallel to the short dimension of the area is the same, comprising:
a source of light;
a light tunnel having an entrance aperture disposed proximate said light source and an exit aperture whereby a portion of the light emitted by said source passes through said light tunnel from said entrance aperture to said exit aperture;
the object being illuminated disposed at the illuminating station adjacent said exit aperture;
said light tunnel including means for providing a substantially equal degree of illuminance from said light source to all portions of said exit aperture;
said light tunnel includes a pair of parallel plates separated by two side plates;
said side plates extending substantially in a line from said light source to the extremities of said exit aperture;
a light absorbing coating on the inside surfaces of said parallel plates of said light tunnel;
said coating extending from said entrance aperture a specified distance measured from said light source toward said exit aperture whereby said distance is determined by the following formula:

$$\tan\alpha = \frac{D}{2a}$$

wherein

2α= the angle at which the total portion of light enters said entrance aperture from said light source;

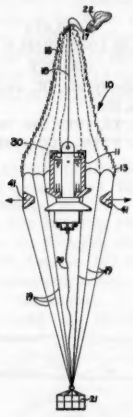
D = height of said tunnel; and

a = distance from said light source to the extremity of said coating on said surfaces measured along a line extending from said light source through the center of said tunnel.

3,913,873
MECHANICAL SPREADER FOR A PARACHUTE

Osyp Nimylowycz, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 2, 1975, Ser. No. 538,049
Int. Cl.² B64D *17/54*
U.S. Cl. 244—149 **7 Claims**



1. In a paracnute arrangement having a canopy skirt depending from a canopy apex, a drogue chute secured to said canopy apex and located externally of said canopy skirt, and a plurality of suspension lines each having one end connected to said canopy skirt and another end with means for attachment to a load,

a lanyard having one end connected to said canopy apex and another end secured to a plug integral with an upper end of a mechanical parachute spreader positioned internally of said parachute skirt,

a firing lanyard having one end connected to an actuating pin of initiator secured in a lower end of said spreader, end means on the other end for attachment to said load, said spreader having an elongated cartridge chamber that is internally threaded at its lower end by which said initiator is secured, said chamber having at its upper end an annular piston integral therewith and a plurality of lateral passages in its sidewall adjacently below said piston, and a propellant cartridge substantially vertically disposed in said chamber intermediate said initiator and lateral passages,

a two-part cylindrical housing having a pair of vertically spaced open end portions and slidably receiving said annular piston,

the lower of said open end portions slidably mounted on and surrounding said propellant chamber, said housing having a lower conically shaped camming surface,

a cylindrically shaped sleeve member slidably mounted on said chamber and having an external annular latching flange,

a plurality of wedge-shaped slugs each having an outer surface connected to selected ones of said suspension lines and an inner surface slidably mounted on said propellant chamber, each of said inner surfaces having a recess and groove arrangement accommodating portions of said annular latching flange, and

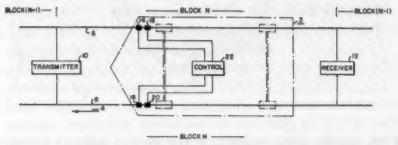
means resiliently biasing said sleeve latching flange and said slugs upwardly toward said housing piston camming surface,

so constructed and arranged that upon compression of said biasing means, ignited propellant gases will drive said housing downwardly and eject said slugs substantially radially outward to assist the attached suspension lines in opening the parachute canopy skirt.

3,913,874
VEHICLE CONTROL SYSTEM INCLUDING RESIDUE BREAKDOWN VOLTAGE ACROSS THE VEHICLE RAILS

Isaac R. Barpal, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 8, 1974, Ser. No. 449,590
Int. Cl.² B61L *3/00*
U.S. Cl. 246—182 R **10 Claims**



1. In a vehicle control system, wherein a vehicle travels along a running surface, including one of running rails and signaling rails, and with said running surface containing an information signal for controlling the operation of said vehicle, the combination comprising:

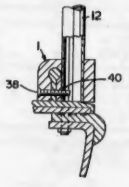
means on said vehicle for impressing a voltage across said rails which has a predetermined magnitude required for breaking down residue present on said rails and greater than the magnitude of said information signals; and

means on said vehicle for sensing said voltage impressed across said rails, including means for signaling a failure condition in response to sensing the absence of said impressed voltage for a predetermined time interval.

3,913,875
STANCHION BASE

Erich Karl Ludwig Bruckmann, 189 Waldoncroft Road, Burlington, Ontario, Canada

Filed Oct. 25, 1973, Ser. No. 409,593
Claims priority, application Canada, Feb. 7, 1973, 163085
Int. Cl.² F16M *13/00*
U.S. Cl. 248—43 **8 Claims**



1. A stanchion base for use with a rail having an upstanding flange thereon, said base comprising:

i. a block of substantially rigid material, said block including at least;

a. a first hole for slidably receiving a stanchion member, the axis of said first hole being located in a first plane,

b. a second open-ended hole for slidably receiving said

upstanding flange, said second hole being defined by a pair of spaced apart opposed side surfaces disposed on each side of a second plane, said second plane being spaced from said first plane, said side surfaces being joined by a top surface, said top surface being disposed at a selected angle between 45° – 90° relative to the axis of said first hole, and further including

ii. at least one retaining member passing through said block and said flange into said stanchion.

3,913,876

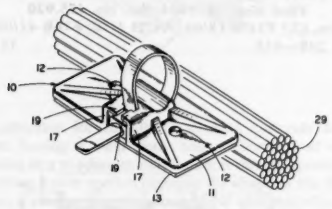
CABLE TIE SUPPORT

William E. McSherry, Country Club Hills, Ill., assignor to Panduit Corporation, Tinley Park, Ill.

Continuation of Ser. No. 283,397, Aug. 24, 1972, abandoned. This application June 10, 1974, Ser. No. 477,558

Int. Cl.² F16L *3/12*

U.S. Cl. 248—74 PB **14 Claims**



1. A cable tie support comprising a base having mounting means for securing said support to a mounting surface and cable tie retaining means for releasably retaining a cable tie, said cable tie retaining means comprising bridge structure in the form of a pair of spaced uprights extending from said base and defining a strap head opening therebetween, and a lateral projection extending from each of said uprights toward the other of said uprights, each of said projections terminating in an end portion short of said other of said uprights, one of said projections extending a greater distance from its upright than the other said projection extends from its upright, said projections defining a strap retaining opening therebetween, said strap retaining opening having a restricted entrance portion defined by said end portion and an enlarged portion, said entrance portion being wider than the thickness of the strap portion of said cable tie and narrower than the width of said strap portion, said enlarged portion being wider than the width of said strap portion whereby a cable tie is adapted to be positioned in said cable tie retaining means by inserting the strap portion laterally between said projection and the other of said uprights and twisting the strap portion into said enlarged portion while positioning the strap head in said strap head opening.

3,913,877

PEDESTAL FOR A LOUDSPEAKER

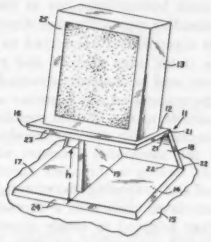
Morris I. Wiener, Plandome Manor, N.Y., assignor to Rectilinear Research Corporation, Bronx, N.Y.

Filed Oct. 24, 1974, Ser. No. 517,624

Int. Cl.² A45D *19/04*

U.S. Cl. 248—174 **1 Claim**

1. A pedestal apparatus for supporting a loudspeaker in relationship to a floor surface, said pedestal apparatus having a first surface for providing support to said loudspeaker and a second surface which is to be supported by said floor surface, said first surface being inclined to said second surface, a top member forming said first surface, a bottom member forming said second surface, supporting means for supporting said top member relative to said bottom member, said top member having a frontal portion located at the upper part of said inclined first furface and a rearward portion located at the lower part of said inclined first surface, said bottom member having frontal and rearward portions corresponding respectively to the frontal and rearward portions of said top member, said support means comprising a first support member which runs from said rearward portions of said top and bottom members to the frontal portions of said members and connectively supports interior regions of said members therebetween through a dimension that increases in going from said rearward portions to said frontal portions, said dimension of said first support member increasing in a manner which follows said inclined first surface, said support means further including a second support member which runs along and connectively supports said rearward portions of said top and bottom members, a first acoustic energy absorbing means affixed to said first surface, a second acoustic energy absorbing means affixed to said second surface, said first acoustic energy absorbing means affixed to said first surface in a region thereof providing support for said speaker, said second acoustic energy absorbing means affixed to said second surface in a region thereof to be supported by said floor surface, each of said acoustic absorbing means comprising a plurality of strips of complient material.



3,913,878

IRONING BOARD ATTACHMENT

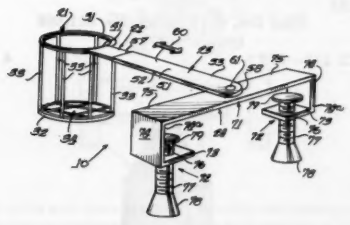
Flora Wayne, 7829 South Chappel, Chicago, Ill. 60649

Filed Aug. 23, 1973, Ser. No. 390,732

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F16M *13/00*

U.S. Cl. 248—311 **3 Claims**



1. An ironing board attachment intended for holding a starch can and the like adjacent the top surface of an ironing board, comprising:

a hollow cylindrical basket open at the top end and closed at the bottom end and formed of skeleton frame members including top and bottom concentrically disposed longitudinally spaced apart ring members interconnected about their circumferal peripheral edges by longitudinally extending rods spaced circumferally thereabout and secured to the top and bottom rings respectively, the bottom ring including a plurality of criss-crossing rod like members disposed in the plane defined by the bottom ring

and forming a skeleton type end frame platform for the basket;

an elongated thin rectangular tongue forming member having one end connected to the peripheral edge of the top ring of the basket with the opposite free end extending radially outwardly therefrom normal to the axis of the basket;

a clamping member adapted to be removably secured to the peripheral edges of the ironing board, the clamping member comprising a pair of generally C-shaped brackets spaced apart in confronting relationship and each including an inwardly directed bottom member, a side member connected to each bottom member at the outer edge thereof and extending upwardly therefrom, and an inwardly directed top member connected to each bottom member at the outer edge thereof and extending upwardly therefrom, and an inwardly directed top member connected to the associated side member and extending substantially parallel to the bottom member, a spacing bar formed integrally with the top member connecting the same and the associated brackets together, each bottom member having a threaded aperture disposed centrally thereof and extending therethrough, each aperture having associated therewith a threaded elongated bolt like member adapted to rotate about its axis and having an enlarged head portion permitting each grasping thereof between the fingers of an individual's hand, and also including an inner terminal end disposed intermediate the interior surfaces of the bottom member and associated top member, each terminal end including a circular flat disc disposed concentric with the bolt member and pivotally attached thereto about its axis for rotation relative thereto; and

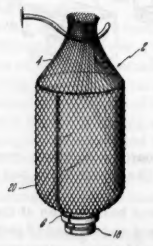
an elongated arm member having an elongated rectangularly shaped channel extending longitudinally therethrough, one end of the arm being pivotally attached to the clamping member for pivotal movement of the arm thereabout in a plane substantially parallel to the plane of the ironing board top surface when the attachment is positioned thereon, the channel opening out the opposite free arm end and adapted to slidingly receive therein in a telescopic manner the basket tongue member so as to support the basket adjacent a peripheral edge of the ironing board.

3,913,879

CONTAINER HOLDER

Thomas H. Wright, Jr., 1500 SW. 5th Court, Boca Raton, Fla. 33432

Filed Dec. 4, 1973, Ser. No. 421,588
Int. Cl.² A47K *1/08*
U.S. Cl. 248—318 **4 Claims**



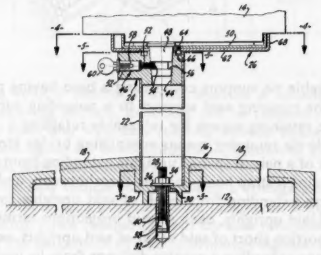
1. A container holder for holding a container upside down to permit contents therein to pass through an opening in the top of the container, said holder comprising a tubular body of mesh construction for receiving and supporting a container, means forming a restricted opening at the bottom of the tubular body of mesh construction to receive the neck of a container and support a container, the upper part of the mesh construction forming means for mounting the container holder and a container, said means forming a restricted opening comprising ring means fixed to the bottom of said mesh construction, said ring means comprising a first ring having an inner and outer surface and a second ring having an inner and outer surface, said tubular body of mesh construction extending through the inner surface of said first ring and back over the outer surface of said first ring, said second ring having its inner surface placed over the portion of the surface of the tubular body of mesh construction over the outer surface of the first ring, said first and second rings being fixed in place.

3,913,880

SUPPORT STAND FOR AN APPLIANCE

Joseph A. Lucascy, 2639 E. 9th St., Oakland, Calif. 94601, and William L. Boscacci, 2419 Edgehill Court, San Leandro, Calif. 94577

Filed Mar. 28, 1974, Ser. No. 455,920
Int. Cl.² F16M *13/00*; A47H *1/10*; F16B *41/00*
U.S. Cl. 248—415 **11 Claims**



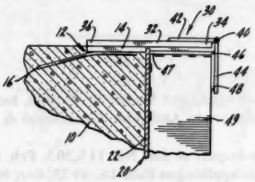
1. An appliance support stand comprising: a base having means for fixedly securing said base to a pre-existing support surface; a mounting unit connected to said base, said mounting unit including a socket for receiving a spindle, and, a locking mechanism having a key operated displaceable bolt extendible into said socket; and, a support platform having a projecting spindle insertable and rotatable in said socket, said spindle having a longitudinal axis substantially perpendicular to said support platform, means for fastening said support platform to an appliance, a cover shield arranged between said support platform and said mounting unit concealing said fastening means, said cover shield having first coupling means on said cover shield and said support platform having second coupling means on said support platform, said first coupling means being slidably cooperative with said second coupling means for engaging said cover shield to said support platform, and at least one machine screw which fastens said cover shield to said support stand, said machine screw being positioned such that it is concealed between said mounting unit and said cover shield; wherein said spindle includes a peripheral channel formed to receive said displaceable bolt in all angular orientations about said longitudinal axis of said spindle when said spindle is inserted in said socket, said spindle being rotatable in said socket and inhibited from withdrawal from said socket by said bolt.

3,913,881

WELD PLATE ASSEMBLY POSITIONING APPARATUS

Harry W. Gobler, Santa Rosa, Calif., and Robert Grotheer, Cincinnati, Ohio, assignors to Ecodyne Corporation, Lincolnshire, Ill.

Division of Ser. No. 273,065, July 10, 1972, abandoned. This application Apr. 15, 1974, Ser. No. 461,038
Int. Cl.[2] B28B 7/22
U.S. Cl. 249—83 5 Claims



1. Apparatus for forming a precast concrete structural member, having a weld plate and anchoring rod assembly embedded at a predetermined location therein, comprising: a form having a skin portion defining the shape of the structural member; a connecting plate associated with said skin portion having an outer end pivotal about a substantially horizontal axis and an inner end having a down position immediately above said predetermined location within said skin portion and an up position exterior of said skin portion; said outer end of said connecting plate being spaced exterior of said skin portion such that when said inner end of said connecting plate is in said up position removal of the precast member from said form is not impaired by said connecting plate; and means associated with said outer end of said connecting plate for releasably securing said weld plate and anchoring assembly to said connecting plate such that when said connecting plate is in its down position said weld plate and anchoring assembly is positioned within said skin portion and when said connecting plate is moved to said up position said weld plate and anchoring rod assembly remain embedded within said precast structural member.

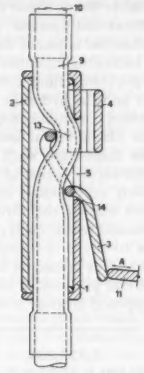
3,913,882

DEVICE FOR CONTROLLING THE FLOW OF FLUID THROUGH FLEXIBLE TUBES

Camille Moulet, Cannes, France, assignor to Crinospital S.p.A., Palazzo Pignano (Cremona), Italy

Filed Oct. 23, 1973, Ser. No. 408,924
Claims priority, application Italy, Oct. 31, 1972, 31157/72
Int. Cl.[2] F16K 7/06
U.S. Cl. 251—9 2 Claims

1. In a device for controlling the flow of fluid through a flexible tube having a longitudinally extending hollow body with longitudinally opposed apertured walls for accommodating the tube, the body having a transverse apertured wall and tube engaging means operable through the aperture of said transverse wall for compressing a portion of the tube and thereby controlling the flow of fluid through the tube, the improvement wherein said tube engaging means comprises a lever extending through the aperture of the transverse wall and mounted for pivotable movement with respect to said aperture, said lever having an arm portion located outside of the body for contact by the operator and a looped portion located within the body, said looped portion encircling the periphery of the tube within the body and having a section on the far side of the tube from the lever arm portion lying opposite the aperture in the transverse wall, so that when pressure is applied to the arm portion of the lever to pivot it towards the body, the said section of the looped portion compresses



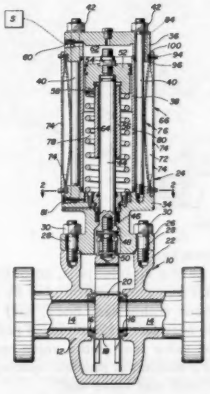
the tube at a location adjacent to and in a single direction toward the transverse aperture.

3,913,883

MEANS FOR SECURING FLEXIBLE DIAPHRAGM IN FLUID ACTUATOR FOR VALVES

Richard C. Irwin, Sugarland, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed Sept. 3, 1974, Ser. No. 502,325
Int. Cl.[2] F16K 31/12, 43/00
U.S. Cl. 251—25 6 Claims



1. A valve and valve actuator assembly comprising, a valve body defining a valve chamber and a fluid passage in communication with the valve chamber, a gate valve mounted within the valve chamber, a stem connected to the gate valve, and a fluid actuator mounted on the valve body for moving said stem and gate valve between open and closed positions, said fluid actuator including a piston connected to said stem, an inner hydraulic cylinder in which the piston is mounted for movement and having opposed end members of a diameter greater than the diameter of said cylinder, said inner cylinder having a hydraulic fluid pressure chamber adjacent the outer side of the piston and a spring adjacent the inner side of the piston to return the piston and gate valve to a closed position, means to supply hydraulic fluid to said fluid pressure chamber to move the piston and gate valve to an open position, an outer cylin-

drical shroud member mounted on said end members in concentric relation to the hydraulic cylinder and forming an annular chamber between the inner cylinder and shroud member, said shroud member fitting about the outer end member and seating on the inner end member, a diaphragm disposed within the annular chamber adjacent the shroud member and forming a pressure balancing chamber for the inner side of said piston, means providing fluid communication between the annular chamber and the hydraulic cylinder on the inner side of the piston, means communicating the fluid pressure of the fluid medium in which the actuator is positioned outwardly of the flexible diaphragm, each of said end members having an annular outwardly facing groove therein and said shroud member having an opposed inwardly facing groove therein adjacent each end of the shroud member, annular gripping means positioned within each of said shroud member grooves, and means to move the gripping means inwardly when the shroud member is seated on said inner end member to grip the marginal end portions of said flexible diaphragm tightly against the opposed grooves in the end members.

3,913,884
VARIABLE BLEED VALVE

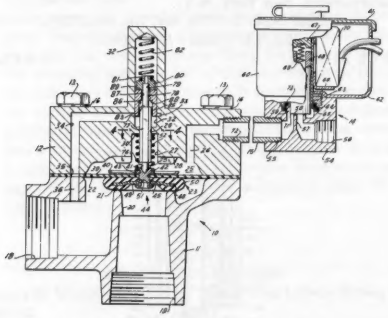
Alfred H. Rolfe, Pottersville, N.J., assignor to Automatic Switch Company, Florham Park, N.J.

Filed July 9, 1973, Ser. No. 377,833

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² F16K *31/385*

U.S. Cl. 251—35 **10 Claims**



1. A valve comprising:

a. a valve body having an inlet port, an outlet port, and an orifice between said ports surrounded by a valve seat;

b. a valve member within said body, said valve member being movable between a valve-closed position, in which it engages said valve seat, and a valve-open position, in which there is a maximum possible spacing between said valve member and said valve seat;

c. a chamber on the side of said valve member opposite said valve seat;

d. means for relieving the pressure in said chamber when desired;

e. a bleed passageway coupling said inlet port of the valve to said chamber;

f. a blocking means movable with respect to said bleed passageway between a blocking position in which it obstructs flow therethrough into said chamber and a flow-permitting position in which it permits full flow therethrough into said chamber, said blocking means being arranged in its blocking position when said valve member is in its valve-closed position; and

g. means responsive to only the final portion of the movement of said valve member from its valve-closed position to its valve-open position for moving said blocking means from its blocking position to its flow-permitting position and responsive to only the final portion of the movement of said valve member from its valve-open position to its valve-closed position for moving said blocking means from its flow-permitting position to its blocking position, each of said final portions amounting to less than one-half the distance through which said valve member moves between its valve-open and valve-closed positions,

whereby fluid flow from said inlet port to said chamber is obstructed until the valve is almost completely open at which time such flow is permitted and full fluid flow from said inlet port to said chamber is permitted until the valve is almost completely closed at which time such flow is obstructed.

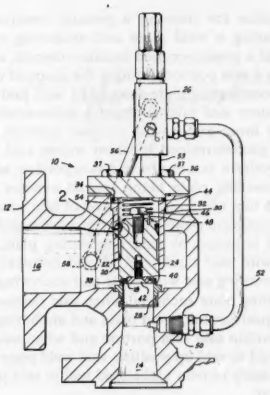
3,913,885
VALVE

Marvin H. Greenwood, and Walter W. Powell, both of Houston, Tex., assignors to Anderson, Greenwood & Co., Houston, Tex.

Continuation-in-part of Ser. No. 113,303, Feb. 8, 1971, abandoned. This application Feb. 16, 1973, Ser. No. 333,219

Int. Cl.² F16J *9/08*; F16K *31/122*

U.S. Cl. 251—63 **9 Claims**



1. A valve comprising a body having an inlet, an outlet and a valve seat surrounding communication through said body between said inlet and said outlet,

a bore defined within said body,

a valve member positioned to reciprocate within said bore and adapted to move into and from engagement with said valve seat to control flow through said body, said valve member and said bore defining mutually facing parallel surfaces,

means supplying a controlled pressure actuating fluid to one end of said valve member,

means for sealing between said valve member and the wall of said bore,

a tapered groove formed in one of said surfaces and having an angle of taper from 10° to 20° in a section with respect to said bore wall and with the angle of said groove opening toward the end of said valve member to which said actuating fluid is supplied, and

pressure responsive means to provide a drag force resisting relative movement of said valve member and said bore, said pressure responsive means including wedge ring having a tapered surface preformed with the same angle of taper as said groove, said wedge ring being positioned in said groove and urged therein to be forced by the incline of said groove against the other of said surfaces whereby the movement of said valve member is stabilized by the drag forces created by the forcing of said wedge

ring against the other surface responsive to the pressure of actuating fluid exerted against said valve member.

3,913,886

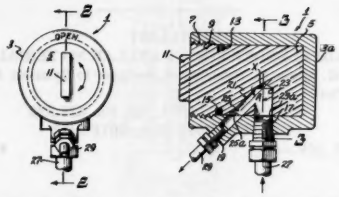
ROTARY PLUG VALVE

Peter A. Di Cicco, 287 Grove St., Brockton, Mass. 02720

Filed Mar. 6, 1974, Ser. No. 448,625

Int. Cl.² F16K *5/04*

U.S. Cl. 251—215 **5 Claims**



1. A rotary valve for controlling fluid flow, which valve comprises, in combination:

a. a substantially cylindrical housing having a closed end wall and provided with an inlet port and an outlet port through the side wall thereof wherein:

1. the central axis of the inlet port is substantially perpendicular to the longitudinal axis of the housing, and

2. the central axis of the outlet port intersects and forms an acute angle with the central axis of the inlet port,

and

b. a substantially cylindrical plug rotatably disposed and threadedly connected within the housing for limited rotational movement such that the plug abuts against the end wall when the valve is in an open position, which plug includes only an angular passageway therethrough with the ends of the passageway forming an inlet opening registering in linear continuation with the respective inlet and outlet ports in the housing in one position of rotation of the plug, with the cross-sectional diameters of the corresponding ports and openings being the same and forming smooth linear passageways for fluid flow therethrough.

3,913,887

VALVE HOUSING AND METHOD OF MAKING THE SAME

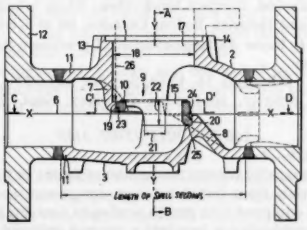
Walter Siepmann, Belecke, Germany, assignor to Eugen Vogt, Birrwill, Switzerland

Filed June 7, 1974, Ser. No. 477,493

Claims priority, application Germany, June 22, 1973, 2331748

Int. Cl.² F16K *27/10*

U.S. Cl. 251—367 **4 Claims**



1. A valve housing having a longitudinal axis and a second axis normal thereto and comprising an upper shell section having an open side bounded by an edge face located in a first plane including said first axis and being normal to said second axis, said upper shell section having opposite said open side an opening of predetermined diameter coaxial with said second axis; a lower shell section having an open side bounded by an edge face located in said plane, said edge faces being welded to each other in abutting relationship, each of said shell sections having a semi-circular rib located within said open side, said ribs extending from said respective shell section towards said first plane and having end faces respectively located to opposite sides of said first plane with the end face of the rib on said upper shell section closer to said opening than that of the rib on said lower shell section, the rib on the upper shell section being provided with an inner cylindrical weld face extending along part of a circle substantially coaxial with said second axis upwardly from the end face thereof and the rib on the lower shell section being provided with an opposite inner cylindrical weld face extending along part of a circle also substantially coaxial with said second axis downwardly from the end face thereof, both of said inner cylindrical weld faces having the same diameter which is smaller than said predetermined diameter, said cylindrical weld faces overlap each other to opposite sides of a second plane which includes said second axis and is normal to said longitudinal axis; and an annular seat-forming member having a pair of outer axially offset diametrically oppositely arranged cylindrical weld faces respectively extending along parts of a circle, overlapping each other and respectively matching and abutting against said inner weld faces of said shell sections and being welded thereto.

3,913,888

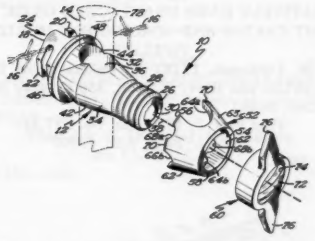
ROD POST INSULATOR FOR ELECTRIC FENCES

Melvin C. Maranell, Minneapolis, Minn., assignor to Sta-Tite Corporation, St. Bonifacius, Minn.

Filed Dec. 9, 1974, Ser. No. 531,093

Int. Cl.² A01K *3/00*

U.S. Cl. 256—10 **9 Claims**



1. An insulator for supporting an electrically conductive fence wire and securely mountable on any one of a plurality of rods within a predetermined range of rod thicknesses comprising:

an insulator body formed of insulative material and including fence wire retaining means capable of holding the fence wire, and further including an elongated threaded shaft having a rod-receiving opening therethrough with entry and exit for the rod, said opening being of a size capable of receiving the rod of greatest thickness within the range;

a washer formed of insulative material and having a shaft-receiving orifice therethrough, said washer mounted with said shaft of said insulator body passing through said orifice with said washer movable toward and away from said rod-receiving opening and capable of overlapping said opening of said shaft to reduce the effective size of said rod-receiving opening to bear against and closely confine within said opening a rod having a thickness equal to the smallest rod thickness within the range; and

a threaded nut threadably engaging said threaded shaft and adjacent said washer and in response to rotation of

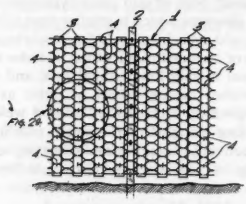
said nut urging said washer along said shaft toward said opening to successively further overlap said opening so as to be capable of gripping a rod within the range of thicknesses between said washer and said body to securely hold said body on the rod.

3,913,889

SNOW FENCE

William A. Nugent, Garden City, N.Y.; William Lloyd Williams, Landenberg, and Hugh A. Bogle, West Chester, both of Pa., assignors to West Chester Chemical Company, West Chester, Pa.

Filed Oct. 11, 1973, Ser. No. 405,410
Int. Cl.² E01F *7/02*; E04H *17/04*
U.S. Cl. 256—12.5 **3 Claims**



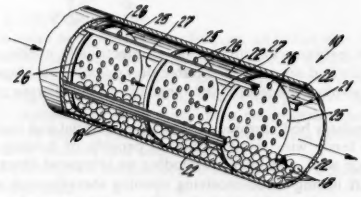
1. A barrier fence for controlling drifting particulate material which comprises an elongated wire mesh base forming the base of the fence and a plurality of formed synthetic plastic slats fixedly positioned at right angles to the long axis of the mesh base in horizontally spaced relationship therealong and each slat is secured at a plurality of vertically spaced points by staples to one side of said mesh base.

3,913,890

RELATIVELY HARD UNATTACHED OBJECTS TO INHIBIT CAKING AND SCALING IN A HORIZONTAL PIPELINE

Arthur W. Lankenau, 12282 W. Dakota Drive, Lakewood, Colo. 80228, and Harry B. Scott, 350 Gregory Drive, Golden, Colo. 80401

Filed Mar. 2, 1973, Ser. No. 337,287
Int. Cl.² B01F *9/06*, *15/02*
U.S. Cl. 259—3 **10 Claims**



10. Apparatus for inhibiting the adherence of particulate matter in a substantially horizontal pipeline having inlet and outlet ports, comprising:

a rotatable interior surface provided in the line which surface is substantially non-displaceable radially out of its normal planar disposition,

means for introducing noxious gases and cleansing liquids into the line for intermixing to cleanse the gases before emission at the outlet ports,

apertured plates secured to the interior of the pipeline and substantially normal to the pipeline to form the line into a series of compartments,

relatively hard bounceable balls unattached to each other disposed freely within the compartments and in mechanical contact with the interior surface of the line,

doors in the pipeline in communication with each compartment for the introduction of the relatively hard balls into the pipeline, and

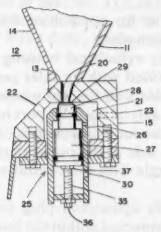
means for rotating the interior surface of the line and the compartment to cause the balls to tumble and bounce in the liquid within the line to distribute the same in the path of the gases and to inhibit the adherence of particulate matter on the interior surface of the line.

3,913,891

AIR BLENDER FOR GRANULAR MATERIALS

James R. Steele, St. Paul, Minn., assignor to Dynamic Air Inc., St. Paul, Minn.

Filed Dec. 26, 1973, Ser. No. 428,332
Int. Cl.² B01J *2/16*; B01F *5/02*
U.S. Cl. 259—4 **4 Claims**



1. An air blender for mixing granular materials comprising, in combination: a container for granular materials having a bottom discharge outlet; a movable closure for closing and opening said outlet for respectively holding and discharging the granular material; an annular air manifold located below said closure, said manifold having a chamber and a plurality of openings from said chamber communicating with the interior of said container through openings spaced around the discharge outlet; an inlet for pressurized air into the manifold chamber; an air operated piston member for each of said openings, each of said piston members located in a housing within the manifold chamber with the closing end of of each piston located opposite and below each of said openings; and an air inlet into the housing for controlling the movement of the piston toward and away from its associated opening to selectively open and close said openings to control the passage of air from the manifold chamber into the container, whereby pressurized air is always present at said openings.

3,913,892

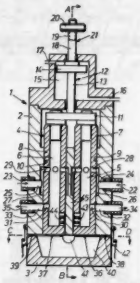
MIXING APPARATUS

Heinrich Ersfeld, Bergisch Neukirchen; Klaus Schulte, Leverkusen, and Heinrich Boden, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Germany

Filed July 16, 1974, Ser. No. 489,027
Claims priority, application Germany, Sept. 27, 1973, 2348609
Int. Cl.² B01F *15/02*, *3/08*
U.S. Cl. 259—4 **7 Claims**

1. In a machine for the production of foams or homogeneous materials from liquid reaction components comprising feed lines equipped with pumps leading to a mixing head, said mixing head having a housing, a control unit and a mixing chamber with an outlet opening enclosed by the housing, the control unit comprising lift slides formed with injection openings which are connected to the feed lines in the working position, said lift slides being fixed to a common yoke

equipped with a control drive, said lift slides being disposed in guide bores separated from one another by a land and a junction plane extending through the mixing chamber, the improvement which comprises lift slides adapted to be withdrawn into the guide bores while in the rest position with their



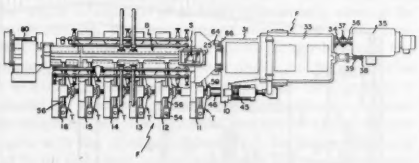
injection openings disposed in said guide bores and adapted to be introduced into a mixing chamber in their working position to such an extent that at least a portion of one injection opening in each lift slide is disposed in the mixing chamber for injection of fluid therein.

3,913,893

CONTINUOUS MIXER

Clarence K. Scherping, Saginaw, Mich., assignor to Baker Perkins Inc., Saginaw, Mich.

Filed Apr. 30, 1973, Ser. No. 355,775
Int. Cl. B01f 7/08
U.S. Cl. 259—5 **20 Claims**



1. A continuous mixer for explosive material and the like comprising:

frame support means;

a mixing barrel thereon including a plurality of longitudinally split barrel sections forming an axially extending passage having an inlet and an outlet, at least one of said barrel sections being movable between a closed, radially inner barrel forming position and a radially outer, open position;

an axially disposed mixing shaft mounted in said passage;

means mounting said barrel and said shaft for relative movement to mix material supplied to said inlet while moving it from said inlet to said outlet; and

means for moving at least said one barrel section between said radially inner position and said radially outer position so that the material in said chamber will be exposed.

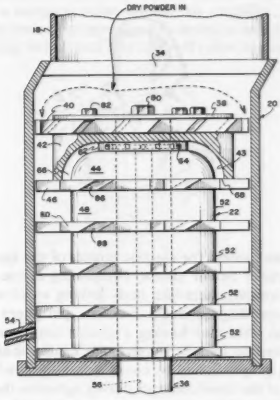
3,913,894

CONTINUOUS FEED MIXING APPARATUS

John E. McFarren, Orangevale, Calif., assignor to Thompson Chemicals, Inc., Palo Alto, Calif.

Filed Apr. 18, 1974, Ser. No. 461,949
Int. Cl.[3] B01F 7/18, 7/26
U.S. Cl. 259—8 **6 Claims**

1. Apparatus for mixing a fluid with a flowable material comprising a mixing chamber having an entrance opening for receiving the flowable material and an exit opening for ejecting the mixture, an agitator rotatably mounted within the mixing chamber and having a fluid carrying passage, the agitator further having spray means in fluid communication with the agitator passage and located at one end adjacent to the



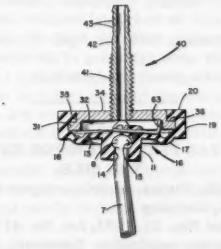
entrance opening for spraying fluid within the agitator passage into the mixing chamber in a direction away from the entrance opening, the spray means creating a suction into the entrance opening of the mixing chamber, means for pumping the fluid into the agitator passage, and means for rotating the agitator within the mixing chamber.

3,913,895

OSCILLATORY STIRRING APPARATUS

Norman Adrian de Bruyne, 3700 Brunswick Pike, Princeton, N.J. 08540

Filed Apr. 8, 1974, Ser. No. 458,846
Int. Cl.[2] B01F 7/16
U.S. Cl. 259—118 **18 Claims**

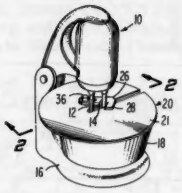


9. The apparatus according to claim **4** further comprising a flat surface on the periphery of said underside to sealingly engage the top surface of the bottle opening through which the apparatus is inserted and an annular ring protruding from said underside and contiguous to the inner edge of said flat surface to sealingly engage the vertical wall of said bottle opening.

3,913,896
SPLATTER SHIELD FOR MIXING BOWLS AND THE LIKE

Ethel M. Hawke, R.D. 2, Milford, N.J. 08848

Filed June 22, 1973, Ser. No. 372,759
Int. Cl. B01f 15/00
U.S. Cl. 259—125 4 Claims



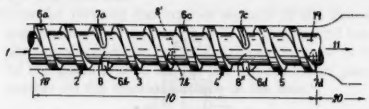
1. A splatter shield for electric mixers of the type including spaced, parallel beater shafts, comprising a one-piece, flat, generally circular, sheet-like body having an elongated, narrow slot extending inwardly from its periphery toward its center point, said slot having a closed inner end, said slot being adapted to loosely receive the beater shafts and said body being proportioned to cover a mixing bowl to prevent splattering of the bowl contents during agitation thereof by the beater shafts; rigid first abutment means on said body disposed transversely of the general length of the slot in spaced relation to said closed inner end thereof in position to normally engage one of the beater shafts at a location upon the body effective to prevent movement of the body in one direction from a bowl-covering position during said agitation of the bowl contents, said inner end of the slot presenting a second rigid abutment means engaging the other beater shaft to prevent movement of the body in the other direction, said first-named abutment means adapted for passage of the beater shafts thereby under the control of a user to disengage the beater shafts from the slot and thereby free the cover, the slot having an elongated, narrow part defined between the first and second abutment means within which the shafts are confined during use to hold the body against rotation, strip the bowl contents from the shafts, and minimize splattering of said bowl contents, said first abutment means comprising a pivoted arm movable between opposite extreme positions in one of which it extends across the slot; a pivot element mounting the arm upon the body for pivotal movement between said opposite extreme positions thereof; and means to lock the arm in said one position, comprising a threaded connection between the pivot element and the body, and shoulder means on the pivot element cooperating with the body in clamping the arm against the body upon tightening of the threaded connection between the pivot element and the body.

3,913,897
SINGLE-THREAD FEED SCREW FOR EXTRUDERS AND THE LIKE

Wilhelm Hanslik, Vienna, Austria, assignor to Krauss-Maffei AG, Munich, Germany

Filed Nov. 21, 1973, Ser. No. 417,753
Claims priority, application Germany, Nov. 21, 1973, 2257007
Int. Cl.² B29B 1/10
U.S. Cl. 259—191 12 Claims

1. In an extruder comprising a generally cylindrical housing and a driven feed screw in said housing defining therewith an upstream compression zone and a downstream expansion zone, the improvement wherein said feed screw has a single thread divided by at least one peripheral gap into a plurality of sections axially adjoining one another within said compressing zone, each of said sections extending over at least one full turn of thread, successive sections terminating in peripherally staggered downstream ends said downstream ends of the

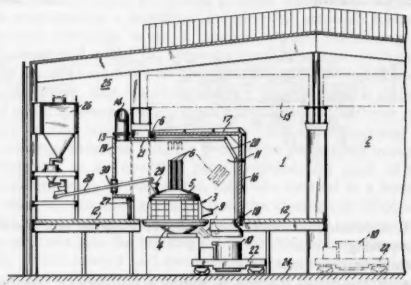


successive sections being peripherally offset from each other by about 180° degrees.

3,913,898
STEEL PRODUCING PLANT WITH ONE OR SEVERAL ELECTRIC ARC FURNACES

Gunter Wolters, Duisburg, Germany, assignor to Gutehoffnungshutte Sterkarade Aktiengesellschaft, Oberhausen-Sterkarade, Germany

Filed Mar. 20, 1974, Ser. No. 453,073
Claims priority, application Germany, Mar. 20, 1973, 2313660
Int. Cl.² C21B 11/10
U.S. Cl. 266—13 3 Claims



1. Multi-bay steel producing plant with at least one electric arc furnace mounted on a floor comprising a closed cell surrounding said at least one arc furnace, said closed cell comprising a wall structure consisting of sound-absorbing materials and exhaust means for exhausting the flue gases contained in said cell, a charging crane located above said closed cell, said wall structure of said closed cell comprising a vertical wall and an upper cover in the area of said charging crane, means for movably supporting said vertical wall and said upper cover to allow access to said at least one arc furnace while said furnace is enclosed in said cell and to allow the charging of the furnace, a transfer vehicle for transferring the steel contained in a ladle to a subsequent processing station, and track means for allowing the transfer vehicle to move laterally of said cell from a position directly under a taphole in said furnace to the subsequent processing station.

3,913,899

DEVICE FOR SUPPLYING OXIDANT FROM A PRESSURIZED RESERVOIR TO A REACTION RESERVOIR

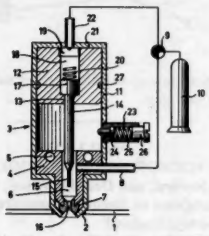
Willem Ludovicus Nicolaas van der Sluys, and Maarten Scheffer, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 3, 1974, Ser. No. 511,661

Claims priority, application Netherlands, Oct. 15, 1973, 7314132

Int. Cl.² F24J *1/00*

U.S. Cl. 266—34 T **2 Claims**



1. In a device for supplying an oxidant from a first reservoir, in which the oxidant is present under pressure, to a reaction reservoir containing a metal or mixture of metals, which is liquid at the operating temperature and which chemically reacts with the oxidant while developing heat, the device having a discharge piece which can be connected to an opening in the wall of the reaction reservoir and which comprises a supply duct which connects with a discharge opening of smaller diameter, the duct having arranged therein a needle holder which is axially movable therein and which supports a needle which is capable of at least substantially closing the discharge opening, the improvement wherein the device comprises a piston slidable over the needle holder between two abutments, a spring acting between needle holder and piston so as to exert a force on the needle holder in the direction of the discharge opening in the closed condition, a cylinder within which the piston is movable, one end of which cylinder connects with the discharge piece duct, its other end being closed by an end plate, an oxidant supply line communicating with the end plate as well as the discharge piece, and a control unit by means of which the communicating connections between these supply lines and the reservoir can be closed or opened.

3,913,900

DEVICE FOR REGULATING THE TENSION IN A RUNNING WEB

Hansruedi Muster, Schonbuhl, and Jean Rohrer, Bern, both of Switzerland, assignors to Maschinenfabrik Wifag, Bern, Switzerland

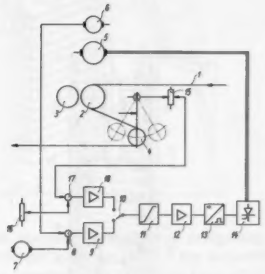
Filed Dec. 6, 1973, Ser. No. 422,368

Claims priority, application Sweden, Dec. 11, 1972, 16138/72

Int. Cl.² B65H *23/22*

U.S. Cl. 226—44 **1 Claim**

1. Device for regulating the tension of a running web, such as a paper web entering a rotary roll printing press, including a take-off roller, a pressure roller associated with said take-off roller, and a pendulum roller located downstream of said take-off roller in the path of travel of the web, so that the web passes between said take-off roller and said pressure roller and over said take-off roller before it passes over said pendulum roller and onto the printing press, wherein the improvement comprises a motor for said take-off roller, a first tachometer-generator associated with said take-off roller motor for providing a first value, a second tachometer-generator associated with the main motor for pulling the web for providing a second value, a first mixing point in communication with said first tachometer-generator and said second tachometer-generator for comparing the first and second values obtained therefrom, a comparison-speed regulator in communication with said first mixing point, a line connected at one end to said take-off roller motor, a reversing switch connected to the other end of said line and selectively connectable to said comparison-speed regulator, a nominal value limiter, an amplifier, an impulse stage and a power unit arranged in series in said line between said reversing switch and said take-off roller motor so that the



regulation of said take-off roller motor can be effected over said comparison-speed regulator and said line, a first potentiometer in operative communication with said pendulum, a second potentiometer for a nominal value, a second mixing point connected to said first and second potentiometers, a nominal-actual value comparison position regulator connected to said second mixing point and selectively connectable through said reversing switch to said line so that said reversing switch can be positioned for connecting said take-off roller motor to one of said comparison-speed regulator and said comparison-position regulator.

3,913,901

RESILIENT SUPPORTING COLUMN OF ADJUSTABLE LENGTH

Werner Molders, Mayen, Germany, assignor to Stabilus GmbH, Koblenz-Neuendorf, Germany

Filed Aug. 12, 1974, Ser. No. 496,704

Claims priority, application Germany, Aug. 16, 1973, 2341352

Int. Cl.² B60G *11/56*

U.S. Cl. 267—34 **7 Claims**

1. A resilient supporting column of adjustable length comprising:

a. an elongated cylinder member having a longitudinal axis, said member including an axial internal wall and axially spaced first and second end walls transverse to said axis, said axial wall and said end walls bounding a sealed cavity in said cylinder member;

b. a piston member axially movable in said cavity toward and away from a position spacedly adjacent one of said end walls and axially dividing said cavity into two compartments,

1. said piston member sealingly engaging said internal wall and axially sealing said compartments from each other when moving from said position thereof away from said one end wall;

c. a piston rod fastened to said piston member and extending therefrom through said first end wall outward of said cavity;

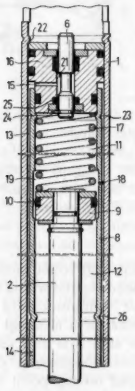
d. first by-pass conduit means for connecting said compartments;

e. manually operable valve means in said conduit means for alternatively opening and sealing said conduit means;

f. fluid filling said compartments and including a body of gas under pressure higher than atmospheric pressure and biasing said piston rod outward of said cavity when said conduit means is open;

g. second by-pass conduit means responsive to axial movement of said piston member into said position for connecting said compartments;

h. yieldably resilient means impeding further axial movement of said piston member from said position thereof toward said one end wall while said second by-pass conduit means connect said compartments,



1. said yieldably resilient means including a compression spring axially interposed between said piston member and said one end wall in one of said compartments and engaging said piston member in said position of the piston member,

2. the force of said spring opposing said further axial movement of said piston member from said position toward said one end wall increasing at a rate greater than the rate at which the biasing force of said body of gas would increase during said further axial movement in the absence of said spring and of a connection between said compartments by said first and second conduit means.

3,913,902

CENTERING MEANS FOR PROCESSING SHAFTS HAVING A SPHERICAL SHAFT END

Wolfgang Hepp, Immenstaad; Klaus Pimiskern, Friedrichshafen, and Werner Herbert, Markdorf, all of Germany, assignors to Dornier System GmbH, Germany

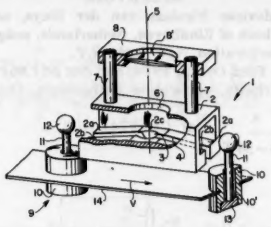
Filed June 25, 1973, Ser. No. 373,259

Claims priority, application Germany, Aug. 11, 1972, 2239621

Int. Cl.² B25B *11/00*

U.S. Cl. 269—8 **4 Claims**

1. A centering device for the processing of shafts having a spherical shaft end comprising a pair of parallel run-up and run-off ramp means forming sliding surfaces and having central horizontal portions and a gap between said means, a centering bore bridging the gap in said horizontal portions, and receiving means for said shafts adapted to travel below and in alignment with said gap and having means associated therewith exerting a downward force on said shafts, said spherical shaft ends traveling on the run-up and run-off ramp



means and being seated in said bore as said receiving means travels below said gap.

3,913,903

MICROTOME KNIFE-HOLDER

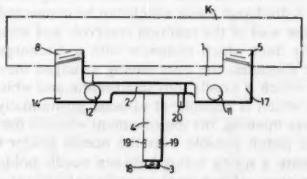
Gerald Hugh Seward, and Donald Wilson, both of Camberley, England, assignors to Shandon Southern Instruments Limited, Camberley, England

Filed Mar. 28, 1974, Ser. No. 455,653

Claims priority, application United Kingdom, Apr. 4, 1973, 16200/73

Int. Cl.² B24D *15/08*; B25B *1/10*

U.S. Cl. 269—100 **8 Claims**



1. A holder for a microtome knife having a back, comprising

a. a pair of complementary and cooperating arms arranged on respective sides of a plane of symmetry, each arm having

1. two ends and a face extending substantially perpendicularly to the plane of symmetry between the ends, the faces of the arms being in opposed and overlapping relationship;

b. a pivotal connection between the opposed arm faces at the midpoints thereof, the axis of the pivotal connection extending in the plane of symmetry and transversely to the opposed and overlapping arm faces;

c. an upstanding jaw member at each of the arm ends, the jaw members at the respective ends of the arms cooperating with each other upon relative pivotal movement of the arms about the pivotal connection for symmetrically closing pairs of the jaw members at each end of the pair of arms and being moved apart upon an opposite relative pivotal movement for symmetrically opening the pairs of jaw members;

d. adjusting means for accomplishing the relative pivotal movement;

e. stop means associated with each of the jaw members for engagement with the back of the microtome knife, the knife being receivable between the pairs of jaw members and being located therebetween by the stop means with an edge of the knife in a selected orientation relative to the arms; and

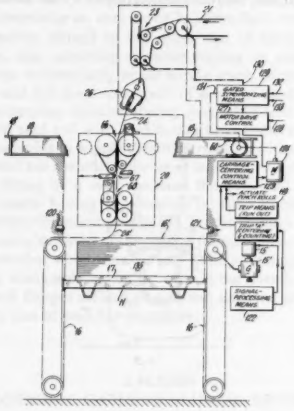
f. means for securing the knife holder in a knife sharpening machine.

3,913,904

STACKING MACHINE FOR RUBBER OR THE LIKE SHEET MATERIAL

Louis Occhetti, Bloomfield, N.J., assignor to Mayer Refrigerating Engineers, Inc., Paramus, N.J.

Filed June 14, 1974, Ser. No. 479,548
Int. Cl.² B65H 29/46
U.S. Cl. 270—30 11 Claims



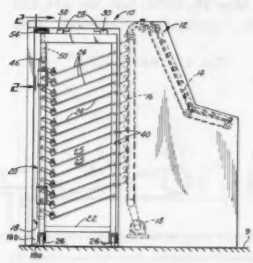
6. Apparatus for stacking horizontal layers of pliant elastomeric sheet material from a continuously supplied web of the material, comprising a frame including horizontal guide ways and horizontally spaced upstanding means for supporting the same, a carriage guided by said ways and first drive means for reciprocating displacement of said carriage along said ways and over the space between said upstanding means, web-supply means fixedly positioned above said carriage for gravitationally downwardly delivering continuous web to said apparatus generally in the central vertical plane on either side of which said carriage is reciprocable, elevator means within said frame and including means for controlling the elevation of a stack-receiving platform beneath the path of reciprocating displacement of said carriage, web-hugger means carried by said carriage and on a common vertical web-supporting alignment which passes through coincidence with said plane on each reciprocating displacement stroke of said carriage, second drive means for said hugger means and synchronized with said first drive means to provide substantially the same speed of web-advance as for carriage displacement, said first drive means including means coacting with adjustably preselected opposite limits of carriage travel along said ways for reversing the direction of carriage displacement, a pair of web-pinch rolls and pendulous support means therefore about a horizontal axis through said plane, said pinch rolls being positioned vertically between said web-supply means and said web-hugger means, means connected to and reacting between said carriage and a part of said frame for angularly displacing said rolls about the axis of pendulous support as a function and in the direction of the position of said upper web-hugger means along the path of carriage reciprocation, said pinch rolls and at least the upper portion of said hugger means being separable for admission of a leading edge of supplied web material, and means responsive to a run-out of web material for actuating said separable rolls and hugger means to separated relation and for terminating reciprocation of said carriage, with return to said plane of the web-supporting alignment of said web-hugger means, whereby upon run-out of supplied web material, said apparatus automatically conditions itself for clean reception of the leading edge of a subsequent supply of web material.

3,913,905

SHEET DISTRIBUTING MECHANISM

Erwin F. C. Schulze, Novelty, Ohio, assignor to Addressograph-Multigraph Corporation, Cleveland, Ohio

Continuation of Ser. No. 174,751, Aug. 25, 1971, abandoned.
This application June 21, 1973, Ser. No. 372,111
Int. Cl.² B65H 29/60, 31/24
U.S. Cl. 271—64 6 Claims



1. A sheet distributing apparatus comprising distributor means disposed on a support surface for sequentially delivering sheets to a longitudinally extending array of delivery gates, said distributor means including means defining a recess having a bottom opening through which said recess is exposed to said support surface and a side opening forming a continuation of said bottom opening and extending upwardly from said support surface, said longitudinally extending array of delivery gates being disposed in said distributor means adjacent to one side of said recess, a plurality of tray means for receiving sheets from said gates, frame means disposed in engagement with said support surface for supporting said tray means for movement between a first position in which said tray means are disposed entirely outside of said recess and a second position in which said tray means are disposed within said recess adjacent to said longitudinally extending array of delivery gates, said frame means including wheel means for supporting said frame means for movement along said support surface between said first and second positions, said wheel means being disposed in engagement with said support surface when said frame means is in said first position and extending through said bottom opening into engagement with said support surface when said frame means is in said second position, said frame means being movable through said side opening during rolling engagement of said wheel means with said support surface.

5. A sheet distributing mechanism comprising conveyer means for moving sheets along a path of travel, a plurality of gate means disposed in a longitudinally extending array adjacent to the path of travel for diverting sheets from the path of travel, a plurality of spaced apart shelves having parallel upper surfaces for receiving sheets from said gate means, each of said shelves being associated with one of said gate means and having a first end portion adjacent to the associated one of said gate means and a second end portion opposite from said first end portion, a plurality of mounting means each of which is connected with the first end portion and associated with one of said shelves for supporting the associated one of said shelves for pivotal movement about an associated one of a plurality of parallel axes disposed adjacent to the first end portions of said shelves, and actuator means connected with the second end portions of each of said shelves for effecting simultaneous pivoting movement of each of said shelves about the associated one of said axes while maintaining said upper surfaces of said shelves in a parallel relationship with each other to simultaneously adjust the angular orientation of the upper surfaces of each of said shelves relative to its associated axis and said path of travel, said actuator means including means for retaining each of said shelves in a selected angular

orientation upon movement of said shelves to the selected orientation.

3,913,906

TURNING ARRANGEMENT FOR SHEETS SUPERIMPOSED IN A STACK AND HAVING DIFFERING FRONT AND REAR SIDES

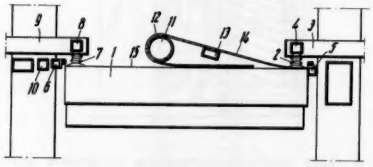
Hilmar Vits, Leichlingen, Germany, assignor to Vits Maschinenbau GmbH, Langenfeld, Germany

Filed May 29, 1974, Ser. No. 474,433

Claims priority, application Germany, June 1, 1973, 2328007

Int. Cl.² B65H *3/08*

U.S. Cl. 271—91 **7 Claims**



1. Turning arrangement for superimposed stacked sheets having differing front and rear sides, comprising gripper elements adapted to engage the leading edge of the presently uppermost sheet in the stack and for sideways withdrawing of said sheet from the front edge of said stack; a plurality of second gripper elements located in a first operative position above the rear edge of said stack, said second gripper elements adapted to engage the rear edge of a second sheet located immediately below said uppermost sheet and being movable in conjunction with said second sheet to a second operative position rearwardly of the rear edge of said stack and from said second operative position to said first operative position without said sheet; and a plurality of third gripper elements movable from a first operative position rearwardly of the rear edge of said stack in a trajectory towards a second operative position above the front edge of said stack while conveying said second sheet received from said second gripper elements and then movable to the first operative position thereof without said sheet.

3,913,907

AQUATIC EXERCISING ASSEMBLY

Charles O. Baker, 1805 Sherington Place, Apt. U306, Newport Beach, Calif. 92660

Filed Sept. 13, 1974, Ser. No. 505,561

Int. Cl.² A63B *23/04*

U.S. Cl. 272—57 R **10 Claims**

1. An aquatic exercising assembly in which a portion of the components thereof are manually adjustable to subject the arms and legs of a user and associated muscles to desired degrees of stressing as the legs and arms are moved through a body of water with said assembly mounted thereon, said assembly including:

a. first and second pairs of fin defining members having first and second ends and first and second oppositely disposed sides, said first and second members adjacent said first ends thereof having first and second transverse openings therein;

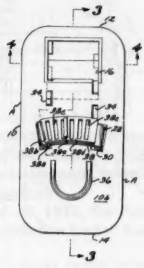
b. first and second pairs of flat valve members of greater transverse areas than said first and second openings;

c. first and second means on said first and second pairs of members for slidably and adjustably supporting said first and second pairs of valve members adjacent said first sides relative said openings to permit said first and second pairs of valve members to be disposed in first positions where they completely obstruct said openings, said positions where said valve members do not obstruct said openings, and third positions intermediate said first and second positions where said first and second pairs of valve members partially obstruct said openings;

d. third means on said first pair of members for removably securing said first pair of members to the feet of said user;

e. fourth means on said second pair of members for removably gripping the wrists of said user; and

f. a pair of transverse handles on said second pair of members that may be removably gripped by the hands of said



user when said wrists of said user are engaged by said fourth means, with said first and second pairs of members when moved through said body of water by the arms and legs of said user offering resistance to being so moved, with the degree of said resistance and the degree of exercise to which said arms and legs of said user are subjected in overcoming said resistance being controlled by the positions of said first and second pairs of valve members relative to said openings to regulate the flow of water therethrough.

3,913,908

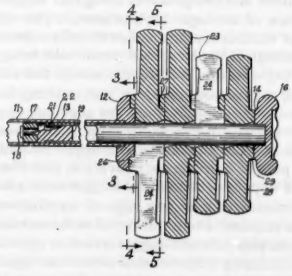
BARBELL HAVING A DETACHABLY MOUNTED WEIGHT SUPPORTING BAR

Henning J. Speyer, Chicago, Ill., assignor to Sears, Roebuck and Co., Chicago, Ill.

Filed June 29, 1972, Ser. No. 267,661

Int. Cl.² A63B *11/02*

U.S. Cl. 272—84 **3 Claims**



1. An exercising device for supporting removable weights adjacent the ends thereof comprising an internally unthreaded hollow rod, a flange having a central bore affixed on each end

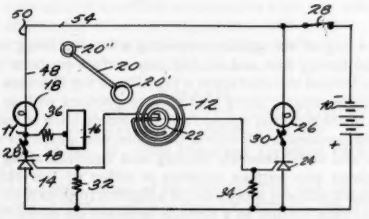
of said hollow rod, each of said flanges affixed to said rod having a plurality of substantially identical spaced radial protuberances on its outwardly facing surface, and a pair of bar members, each of said bar members being partially, telescopingly, unthreadingly slidably insertable into said rod, each of said bar members having a flange affixed to one end thereof and having unthreaded rotatable camming locking means affixed to said bar member for frictionally retaining said bar member in the hollow interior of said rod and retarding movement of said bar member axially of said rod, said locking means comprising an eccentrically journalled, rotatable camming member affixed to the other end of each of said bar members, said camming member having its cross-sectional dimensions substantially equal to the cross sectional dimensions of said bar members, each of said bar members and its affixed camming member being insertable into the hollow interior of said rod with said camming members being lockingly engageable in weight retaining relation with said rod, and each of said bar members having at least one weight means for resisting lifting by a user mounted thereon, said at least one weight means having a plurality of substantially identical radial means for mating with the protuberances on the outwardly facing surfaces of one of the flanges affixed to said rod or with another weight means and to be lockingly and antirotationally clampable on either of said bar members between one of said flanges affixed to said rod and one of the flanges affixed to one of said bar members.

3,913,909

ELECTRONIC GAME OR MANUAL DEXTERITY TESTING DEVICE

James D. Bissell, Lakeview Drive, Lake Hills, Rte. 1, Pfafftown, N.C. 27040

Filed May 17, 1974, Ser. No. 471,025
Int. Cl.² A61B 5/10, 5/16
U.S. Cl. 273—1 E **13 Claims**



1. A game or manual dexterity testing device having an electronic circuit, said circuit comprising:

a first conductor defining a predetermined path;

a source of electrical energy;

a first switch in circuit with said source and said first conductor;

a first impedance in circuit with said switch;

a second conductor in circuit with said switch;

a first indicator in circuit with said switch and with said source; and

an independent tracing conductor for following said predetermined path;

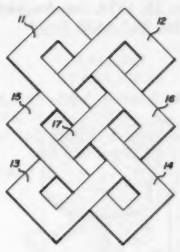
said switch being closed and said indicator being activated only when an operator of the game or device touches said second conductor simultaneously with said tracing conductor contacting said first conductor while said operator is touching said tracing conductor.

3,913,910

MULTIPLE LOOP CONFIGURATION PUZZLE

Gary L. Sahl, 825 Seacliff Drive, Aptos, Calif. 95003

Filed Nov. 11, 1974, Ser. No. 522,595
Int. Cl.² A63F 9/10
U.S. Cl. 273—157 R **3 Claims**



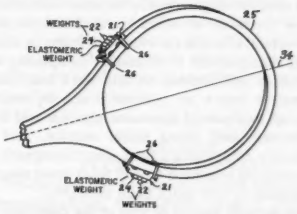
1. A puzzle comprising four J-shaped members, two reverse L-shaped members, and one straight member which, when properly arranged together, form a geometric figure with a continuous line, multiple loop configuration.

3,913,911

TENNIS RACKET WITH HEAD FRAME WEIGHTING MEANS

Kenneth Alan Peterson, 12530 8th Ave. Northwest, Seattle, Wash. 98177

Filed Jan. 9, 1974, Ser. No. 432,075
Int. Cl.² A63B 49/04
U.S. Cl. 273—73 C **1 Claim**



1. In combination, a game racket and weighting means therefor, comprising: said racket having a closed loop head portion and a handle portion extending therefrom, said racket having a central longitudinal axis with said head portion symmetrically disposed thereabout, said weighting means being disposed on said head portion at transverse and symmetrical locations relative to said axis, each of said weighting means includes a bracket, a plurality of weights, and a plurality of flexible securement straps, each of said brackets having an outer surface and an inner surface, said outer surface having an upstanding portion, a dead-ended T-shaped slot formed in said upstanding portion, said slot further having overhanging flanges, said upper surface further including strap receiving groove means located on both ends of said upper surface, at least one of said groove means being disposed at a lower elevation than said slot, said inner surface being configured to conform to the outer curved surface of said head portion, said weights having at least a T-shaped formation and being slidably and removably disposed and frictionally held in said slot for increasing and decreasing the moment of inertia about said axis, said upstanding portion and flanges being of sufficient stiffness to further retain said weights in said slot, said straps being seated in said strap receiving groove means and being

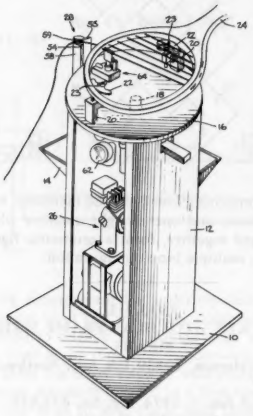
secured about said head portion thereby holding said brackets thereto.

3,913,912

RACKET STRINGING APPARATUS

Melvin William Smith, Alta Loma, Calif., assignor to The Garcia Corporation, Teaneck, N.J.

Filed Apr. 25, 1974, Ser. No. 464,246
Int. Cl.² A63B 51/14
U.S. Cl. 273—73 A **3 Claims**



1. In a racket stringing apparatus for stringing rackets having a frame provided with pairs of apertures for the passage of a string which forms strands between the apertures, said apparatus having a substantially vertically disposed column, a work head assembly rotatably mounted on said column about a substantially vertical axis and on which the frame of the racket to be strung is clamped, the combination comprising a string clamping assembly positionable on said work head assembly below said racket frame to releasably act on said string threaded through said pair of apertures adjacent said frame to releasably maintain said string under tension, said string clamping assembly comprising a base, electromagnetic means for releasably locking said base to said work head assembly in a selected position on said work head assembly,

said electromagnetic means of said string clamping assembly comprising an electromagnet surmounted on said base for sliding vertical movement with respect to said base, means for actuating said magnet when downward pressure is exerted on said magnet to lock said base to said work head assembly, and means for releasing the magnetic force and returning the magnet to its upper inactive position.

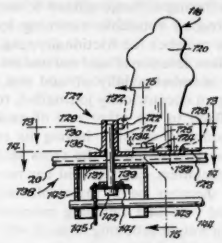
3,913,913

MOUNTING FOR A PLAYING PIECE PROJECTOR

Nicholas D. Trbovich, West Seneca; William P. Robinson, Lockport, and Eugene R. Trunzo, North Tonawanda, all of N.Y., assignors to Servotronics, Inc., Buffalo, N.Y.

Division of Ser. No. 183,861, Sept. 27, 1971, Pat. No. 3,811,674. This application Nov. 2, 1973, Ser. No. 412,468
Int. Cl.² A63F 7/06
U.S. Cl. 273—85 B **8 Claims**

4. A support for a generally flat body comprising: a pedestal having a base, means for mounting said pedestal on a shaft for movement therewith whereby the longitudinal axis of said mounting means would be axially aligned with the shaft, said mounting means for said pedestal being attached to said base, a first pair of laterally spaced ribs on said base defining a first channel therebetween, a second pair of laterally spaced ribs on said mounting means, said second pair of ribs defining a second channel extending in a substantial angular direction of more than 45° relative to said first channel and both of said



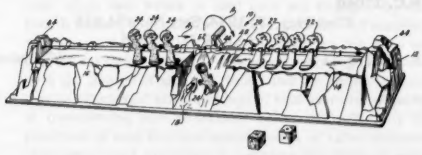
first and second channels lying in a plane substantially parallel to the axis of said mounting means, and said channels being further adapted to snugly receive angularly related portions of a substantially flat body.

3,913,914

TUG OF WAR GAME

Julius Cooper, New Hyde Park, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.

Filed Feb. 3, 1975, Ser. No. 546,233
Int. Cl.² A63F 7/06
U.S. Cl. 273—85 R **17 Claims**



1. A tug of war game comprising a base defining a play surface having first and second play surface portions and a recess formed therebetween; a plurality of toy figurines independently slidable along said surface portions with at least some of the figurines respectively located on each of the play surface portions at the start of the game; and means for selectively and simultaneously moving said figurines along their associated play surface portions in either of two opposite directions whereby movement of a figurine from its associated play surface portion to a position adjacent the recess causes the figurine to fall off of its associated play surface portion, into the recess, and out of the game.

3,913,915

PUTTING BOARD FOR A BASEBALL GAME

Kenneth Carmen, Hauppauge, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Jan. 30, 1975, Ser. No. 545,576
Int. Cl.² A63F 7/06
U.S. Cl. 273—88 **7 Claims**

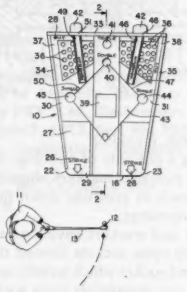
1. A putting board for playing a game of baseball, which comprises:

a. a trapezodial shaped bottom base having a parallel front and rear end;

b. said bottom base having an upward extending rear wall and upward extending triangular shaped sidewalls, wherein said sidewalls extend rearwardly upward;

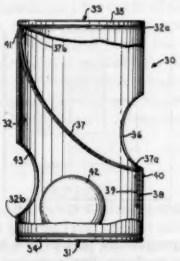
c. a trapezodial shaped planar playing surface affixed to a front edge of said bottom base, the top edges of said sidewalls and a top horizontal edge of said rear wall;

d. an upward extending backboard joined onto a top rear side of said playing surface;
e. upward extending flange members joined onto a top of each side edge of said playing surface, wherein said flanges communicate with said backboard and extend forwardly to said front edge of said bottom base;
f. a baseball diamond printed centrally on said playing surface;
g. said playing surface having a pair of single holes therethrough, wherein said holes coincide with a first base and a third base of said baseball diamond;



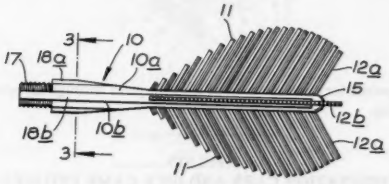
h. a ramp extending rearwardly in an upward direction from a center of said playing surface to a center of said backboard;
i. said ramp having a double opening therethrough, wherein said double opening coincides with a second base of said baseball diamond;
j. said ramp having a triple opening therethrough, and said triple hole rearward of said double hole;
k. two homerun ramps extending upwardly from said playing surface to said backboard, a homerun ramp being disposed adjacent each side of the first said ramp;
l. a plurality of apertures contained in a left rear and a right rear corner of said playing surface; and
m. a golf ball putted onto said playing surface.

3,913,916
INDOOR-OUTDOOR GOAL WITH AUTOMATIC RETURN AND STORAGE COMPARTMENT
James G. Martin, Jr., 9700 Glenwood, Overland Park, Kans. 66212
Continuation-in-part of Ser. No. 410,794, Oct. 29, 1973, abandoned. This application June 12, 1974, Ser. No. 478,718
Int. Cl.² A63B 71/02
U.S. Cl. 273—103 **11 Claims**



10. A ball and combined goal and ball return play device comprising:
a container having an open top and a bottom and a side wall,
a first opening in said side wall at least slightly greater in size than said ball,
an insert within said container and forming a guide positioned to direct said ball from said open top through said first opening, said insert defining a ball storage area with a portion of said side wall and said bottom, and
a second opening in said side wall at least slightly greater in size than said ball, said second opening providing access into said storage area.

3,913,917
STABILISERS
Philip Coxon, 4 York Road, Kings Heath, Birmingham, England (B14 7RZ)
Filed July 25, 1974, Ser. No. 491,800
Int. Cl.² A63B 65/02
U.S. Cl. 273—106.5 C **6 Claims**

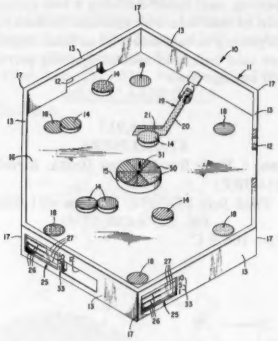


1. A flight for a dart comprising a shaft having a number of vanes extending radially therefrom, said shaft comprising a first shaft part and a second shaft part, the first shaft part having a longitudinally extending slot with an open end and the second shaft part having a formation for locating in said slot with spaced surfaces disposed externally of the slot, said shaft parts having cooperating formations whereby the shaft parts are located against transverse movement, each shaft part bearing at least one radially extending vane comprising a plurality of vane components, and the shaft having a spigot portion at the end of the shaft adjacent the open end of the slot, said spigot portion having securing means whereby it may be secured to a dart body.

3,913,918
PUCK-TYPE APPARATUS
Alvin Trachtman, 321 Southwood Circle, Syosset, N.Y. 11791
Continuation of Ser. No. 168,021, Aug. 2, 1971, abandoned. This application July 11, 1973, Ser. No. 378,069
Int. Cl.² A63F 3/00
U.S. Cl. 273—126 R **1 Claim**

1. A game apparatus comprising:
A game board having a playing surface and a plurality of sides forming the shape of a regular polygon, preselected sides but less than all sides of said boundary having an opening for permitting the escape of a puck, said game board also having a plurality of designated positioning spots for locating the start of play, each of said spots located near a corner of said boundary;
at least one raised obstacle located at the central portion of the game board;
means for determining the starting player, said means rotatably mounted on the obstacle and including pointer and a plurality of color coded segments, said pointer adapted to being struck so as to come to rest on one of said color coded segments, the player whose puck color has been so determined commencing the play of the game;
a plurality of pucks, each initially for positioning on one of said spots, and subsequently for being slidingly propelled along the surface of the game board; and
at least one hockey-style shaped stick for propelling one of said pucks so as to strike other pucks and force other

pucks through said boundary openings, points being awarded for each such striking and a greater number of



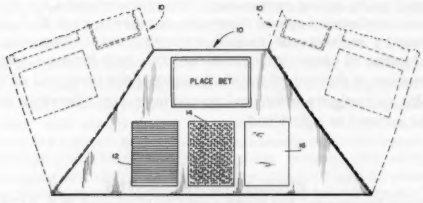
points for each ejection of another puck through an opening.

3,913,919

COMBINATION CARD AND DICE GAME UTILIZED WITH PLAYER MATS

Rufus F. Carpenter, 7617 Lazeau Drive, Jacksonville, Fla. 32211

Filed June 6, 1974, Ser. No. 476,844
Int. Cl.² A63F *1/04*, *9/04*
U.S. Cl. 273—130 H **1 Claim**



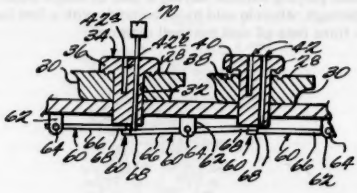
1. A combination card and dice game utilized with player mats comprising three similarly-shaped dice each die being color coded with the color coding of each die being different from the color coding of each of the other dice, a series of markings on each die, each marking of the series being different with the number of markings in the series being less than the number of faces on a die and with each face of a die having one of the markings thereon so as to repeat some of the markings on each die, the repeated markings on the faces of two of the dice being identical and differing from the repeated markings on the third die, a plurality of series of cards, all of said cards having identical backs, the number of cards in each series being equal, each card of a series having the same markings on the face thereof as the other cards of the series, the marking of each series being a respective different one of the different markings of each die, and a plurality of play mats, one for each player, with each play mat having three designated areas for the play of cards thereon with each of the designated areas of each play mat being color coded differently from the color coding on the other designated areas of the play mat, each play mat having its designated areas color coded identical to those areas of the other play mats, and the color coding on the play mat areas being the same as the color coding on the dice.

3,913,920

NAVAL WARFARE BOARD GAME APPARATUS

Lonnie B. Brummit, 126 Lyttle Drive, Newport News, Va. 23606

Filed Nov. 8, 1974, Ser. No. 522,292
Int. Cl.² A63F *3/00*
U.S. Cl. 273—134 GM **7 Claims**



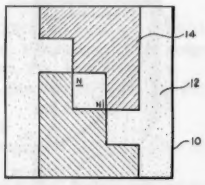
1. A board game, including
a board having a plurality of openings therethrough;
a plurality of movable markers shaped to rest upon the board and each to protrude down through a respective one of said openings;
at least two of said markers having means defining at least two upwardly open sockets formed therein, including at least one blind socket which terminates within the marker and at least one completely open socket which proceeds completely through the respective marker;
at least one lever arrangement positioned beneath the board and including a fulcrum fixing a horizontal pivot axis and a lever pivotally mounted to the fulcrum at the pivot axis, the lever having two opposite ends on opposite sides of the fulcrum, including one end disposed directly under one of said openings through the board, and another end disposed directly under another of said openings through the board;
and pin means which, when one of said markers is mounted in said one opening through the board and when another of said markers is mounted in said other opening, may be pushed down through said completely open socket of said one marker, for at least one angular orientation of said one marker upon the board, to engage one end of the lever so that end of the lever upon being pushed down will cause the opposite end of the lever to rise, engage the other of said markers from under the board and eject said other marker upwardly.

3,913,921

MASK FOR BINGO CARD

Aline M. Bourassa, 3824 Maurice Fabreville, Laval, Canada

Filed May 28, 1974, Ser. No. 473,583
Int. Cl.² A63F *3/06*
U.S. Cl. 273—135 B **3 Claims**



1. A mask adapted to be laid over a bingo card having a plurality of square surfaces disposed over a large square area in adjacent columns and rows, each of said square surfaces displaying a printed number, the said mask comprising a sheet of semi-rigid plastic material having a square area, the said area having two portions of different transparencies, one of

said portions covering the total surface of a group of square unitary surfaces and being substantially colorless to allow clear visibility therethrough, the said square unitary surfaces of the said group being aligned in such a way to define a large symbol, the second of said portions extending over the remaining part of the mask and being substantially less transparent than the said one portion so as to provide a reduced visibility therethrough, whereby the mask, when disposed over a bingo card displays a clear large symbol contrasting from the remaining part of the mask and allows the clear transmission through that symbol of a plurality of numbers identified thereunder on the bingo card.

3,913,922

POSITION SENSING DEVICE FOR A ROTATABLE GAME REEL

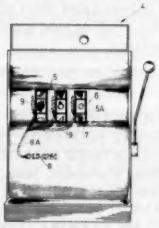
Basil James Richards, Double Bay, and Roger Anthony Adams, West Ryde, both of Australia, assignors to New Century Novelty Company PTY. Ltd., Rushcutters Bay, Australia

Filed July 2, 1973, Ser. No. 375,863

Claims priority, application Australia, July 5, 1972, 9579/72

Int. Cl.² A63F *5/04*

U.S. Cl. 273—143 R **2 Claims**



1. In a rotatable reel gaming machine including a plurality of reels each carrying for individual display on its periphery a series of symbols some of which are repeated in the series, electrical translating equipment for said reels and a pair of electrical leads connecting each said reel to respective inputs of said translating equipment, sensing apparatus for each of said reels comprising an electrically insulating index disc fixed to said reel, pairs of electrical terminals, each of said pairs being disposed in different ones of two concentric circles of terminals on said index disc, electrical resistors on said index disc and connected between respective pairs of said terminals whereby each different symbol on said reel is assigned a different value of electrical resistance, means for indexing each reel, and a pair of contactors for each of said reels with each contactor of a pair connected with a respective one of said leads of said pairs of electrical leads and with said pair of contactors in contact with a pair of said electrical terminals when the respective one of said reels is indexed by said indexing means so as to connect to said electrical translating equipment a resistance value indicative of the symbol displayed by said indexed reel.

3,913,923

CARD RACK AND GUIDE ASSEMBLY

Joseph Wapner, 69 Scarlet Oak Road, Levittown, Pa. 19056

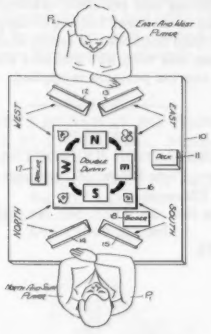
Filed Oct. 24, 1974, Ser. No. 517,769

Int. Cl.² A63F *1/16, 1/18*

U.S. Cl. 273—148 A **4 Claims**

1. An assembly adapted to facilitate playing four-handed bridge by first and second players seated at opposite sides of a game table, the first player acting for both hands of an East-West partnership and the second player for both hands of a North-South partnership, said assembly comprising:

A. a play guide formed of a rectangular plate whose four corners bear West, East, South and North markings in the sequence named, the guide being placeable at the center of the table so that the first player faces the East-West corners and the second player faces the North-South corners, and an instruction ring imprinted on the plate constituted by four symmetrically-arranged compass-marked boxes, each identifying a playing position, and arrows interlinking the boxes to indicate the sequence of play, the box marked North being positioned between the



West and East corners, the box marked East being positioned between the East and South corners, the box marked South being positioned between the South and North corners, and the box marked West being positioned between the North and West corners, and

B. four card-supporting racks, each adapted to hold a full hand of cards for a respective playing position, one pair of said racks being placeable on the table in front of said first player in association with said East-West corners, and the other pair of racks being placeable on the table in front of said second player in association with said North-South corners.

3,913,924

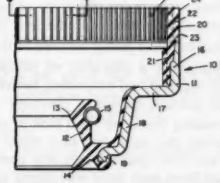
ROTARY SHAFT SEAL WITH EXPANDABLE OUTER PERIPHERY

Gerald A. Barefoot, Ann Arbor, and George L. Corsi, Southfield, both of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Aug. 31, 1973, Ser. No. 393,583

Int. Cl.² F16J *15/24, 15/32*

U.S. Cl. 277—37 **2 Claims**



1. In a rotary shaft seal of the type having a case that fits relatively loosely in a bore and has a flexible synthetic rubber extension bonded thereto and adapted to fit in a space be-

tween said bore wall and another machine part and to be forced to seal against the bore wall, as the result of axial pressure exerted thereagainst by said other machine part, the improvement comprising:

said extension being solely of synthetic rubber having an end wall for engaging a shoulder of said machine part and having a first cylindrical wall facing said bore and a second wall on the opposite side of said first wall facing said machine part and having a series of grooves in alternation with a series of stiffening ribs,

said grooves providing space for accommodating displacement of said synthetic rubber when the space between said machine part and said bore has been occupied by said extension before complete seating of said seal, thereby enabling said complete seating,

said ribs in said second wall helping to support said first wall and, due to their thickness, to assure sealing of said extension between said bore wall and said machine part when the axially exerted pressure is applied.

3,913,925

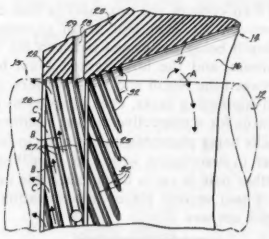
POSITIVE LUBRICATION HYDRODYNAMIC LIP SEAL

Emeric J. Gyory, Park Ridge, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 28, 1973, Ser. No. 419,739

Int. Cl. F16j *15/32*

U.S. Cl. 277—75 **9 Claims**



1. A shaft seal for use between a pair of relatively rotating members under both static and dynamic conditions, one of said members having an opening extending therethrough and receiving said other member therein, comprising an annular resilient seal body adapted to be fixed relative to said one member in a position encircling said other member and an integral inwardly extending inclined flex portion terminating in a generally annular sealing face for sliding engagement with the periphery of the other member, one side of said seal body being exposed to a viscous fluid to be held against leakage, said sealing face including a static lip adjacent the air side of the seal, a spaced secondary lip adjacent the fluid side of the seal, and a viscous shear pump formed in the seal between the spaced lips including a plurality of inboard helices on the sealing face of the seal and extending between the two spaced lips, said flex portion having a plurality of circumferential openings extending from the fluid side of the seal to the sealing face adjacent the static lip, said static lip being effective under static and low speed operating conditions to prevent escape of fluid from said fluid side along said other member, and said inboard helices providing hydrodynamic sealing of the seal under high speed dynamic conditions, said openings allowing fluid flow from the fluid side of the seal to the inboard helices and providing a continuous flow of fluid for hydrodynamic sealing.

3,913,926

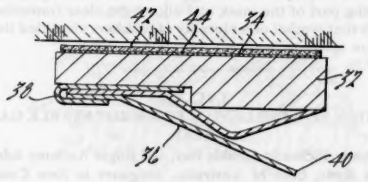
SEAL CONSTRUCTION FOR A ROTARY CERAMIC REGENERATOR FOR USE IN A GAS TURBINE ENGINE

V. Durga Nageswar Rao, Woodhaven, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 15, 1974, Ser. No. 461,195

Int. Cl.² F28D *19/00*

U.S. Cl. 277—96 **3 Claims**



1. A gas turbine regenerator seal for use with a ceramic rotary regenerator matrix, said seal comprising a metal substrate having a seal surface disposed adjacent the surface of the matrix, diaphragm seal spring means for applying a sealing pressure to said metal substrate, a thin, flexible graphite sheet material situated between the surface of said substrate and the adjacent surface of said matrix, said graphite sheet being of a thickness of approximately 0.010 to 0.030 inches, and adhesive means located between said sheet material and one of said adjacent surfaces for bonding said graphite sheet to said one of said adjacent surfaces.

3,913,927

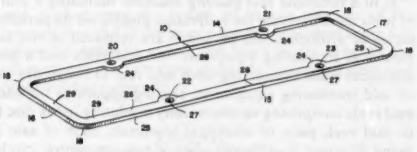
SEALING BOUNDARY GASKET FOR SEALING BETWEEN METAL MEMBERS THAT ARE HELD TOGETHER BY BOLTS

Alexander L. Gordon, Worcester, Mass., assignor to Federal-Mogul Corporation, Southfield, Mich.

Filed Oct. 3, 1973, Ser. No. 403,001

Int. Cl.² F16J *15/00*

U.S. Cl. 277—166 **4 Claims**



1. A sealing boundary gasket for sealing between two members at least one of which is relatively thin and that are held together by a plurality of fastener means, spaced well apart from each other, to seal around an enclosed space, the thin member tending to bend in toward the other member adjacent to the fastener means when the fastener means is tightened, comprising

an integral one-piece molded elastomeric member uniform in composition throughout having a plurality of openings completely surrounded by elastomer, each for receiving a said fastener means,

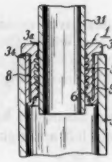
the thickness of said elastomeric member in between said openings varying linearly in a lengthwise direction from a uniform minimum thickness at each said opening and gradually increasing uniformly in thickness to a maximum at the loci which are farthest from a said opening, the thicknesses being uniform along any section transverse to said lengthwise direction.

the changes in thickness being of an amount to compensate for the bending-in of the thin metal member at the fastener means and to provide an even sealing pressure along the complete periphery.

3,913,928
RESILIENT JOINT

Seiichi Yamaguchi, 11-2 Asagaya Minami 1-chome, Suginami, Tokyo, Japan

Filed Sept. 19, 1973, Ser. No. 398,786
Claims priority, application Japan, Apr. 30, 1973, 48-50829; Aug. 13, 1973, 48-90062
Int. Cl.² F16J 9/00; F16L 19/00
U.S. Cl. 277—209 2 Claims

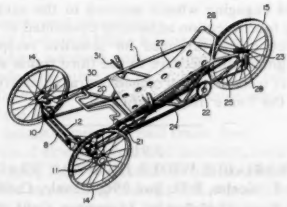


1. A resilient joint for connecting pipes together in a fluid-type relationship comprising an integral hollow cylindrical body formed of natural or synthetic rubber or resilient plastic material and having a longitudinally extending center opening, an outwardly and radially extending flange surrounding said opening at one end thereof, a plurality of vertically spaced resiliently deformable annular fins formed on the inner and outer surfaces of said body, said flange having a greater radial extension than said deformable annular fins on the outer surface of said body, and a hollow cylindrical skirt extending from the other end of said body and being resiliently foldable inwardly into the center opening of said body so that the inner surface of the skirt contacts the annular fins on the inner surface of said body and outwardly about the body so that the outer surface of the skirt contacts the annular fins on the outer surface of said body, whereby the effective thickness of the wall of the body can be selectively increased radially inwardly and outwardly thereof, said skirt having a portion the diameter of which is larger than that of said body and a wall thickness smaller than that of said body.

3,913,929
LOW CENTER OF GRAVITY CYCLE

Hideji Matsuura, Suite 505, 17-17 Mita 4-chrome, Minato, Tokyo, Japan

Filed Mar. 11, 1974, Ser. No. 450,230
Claims priority, application Japan, June 8, 1973, 48-22208
Int. Cl.² B62K 23/06; B62M 1/06
U.S. Cl. 280—7.14 7 Claims

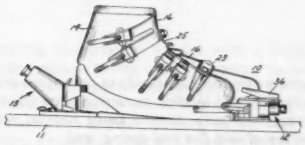


1. A low center of gravity cycle comprising:
a. body means including first and second side members and coupling members coupling said first and second side members;
b. rider support means mounted on said body means for supporting the rider of said cycle in a substantially lying position;
c. surface touching means mounted on the front of said body and touching the surface below said cycle and operatively connected to said body means for supporting said body means above the surface;
d. wheel means mounted on the rear of said body means wherein said body means is positioned below the plane parallel to the surface through the top of said wheel means such that the center of gravity of said cycle with the rider in said rider support means, lies below said plane;
e. pedal means positioned to be operated by the rider's feet;
f. drive linkage means coupling said wheel means to said pedal means wherein the operation of said pedal means by the driver drives said wheel means thereby causing said cycle to move along said surface; and
g. steering means mounted on said body and positioned to be operated by the rider and coupled to said surface touching means for steering said cycle.

3,913,930
SAFETY RUNAWAY SKI THONG

Edward Okonski, 61-53 75th Place, Middle Village, N.Y. 11379

Filed Oct. 10, 1973, Ser. No. 405,191
Int. Cl.² A63C 9/08
U.S. Cl. 280—11.35 N 11 Claims



1. A runaway ski thong device for leashing a boot to a ski comprising a thong having a first end thereof attached to a boot, a coupling element including an enlarged head secured to the other end of said thong, and anchoring means mounted on said ski for engaging and locking said coupling element in response to the application of said coupling element to said anchoring means and being unresponsive to a pull on said thong to release said coupling element and being responsive to a predetermined pressure applied to said anchoring means for releasing said coupling element, said anchoring means comprising a longitudinally extending anchoring member having a longitudinal slot formed therein open at its forward end and closed at its rear end and having a width less than that of said coupling element head, a pawl member underlying said anchoring member and rearwardly converging therewith, said anchoring member and pawl member being relatively moveable to vary the space therebetween and spring means urging said pawl and anchoring members to a contracted condition.

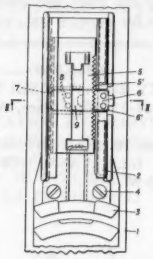
3,913,931
SKI BINDING ELEMENT

Helmut Kratky, Vienna, Austria, assignor to Gertsch AG, Zug, Switzerland

Filed May 20, 1974, Ser. No. 471,239
Claims priority, application Austria, May 25, 1973, 4573/73
Int. Cl.² A63C 9/00
U.S. Cl. 280—11.35 R 5 Claims

3. A device for changing the longitudinal position of a binding on a ski, comprising:
an elongated rail mounted on the upper surface of said ski, said rail including a bottom member, a pair of upstanding side members and an inwardly projecting flange on the upper end of each of said upstanding side members to thereby define a trough therebetween;

securing means for securing said elongated rail to said ski;
means defining a cut-out in at least one of said upstanding side members of said elongated rail;
a flat leaf spring secured to said bottom member, the plane of said flat leaf spring being generally parallel to the plane of an interface between said rail and said ski, the longitudinal centerline of said flat leaf spring being contained in a vertical plane through the center of said cut-out means, said flat leaf spring extending across the width of said bottom member and into said cut-out means;
a binding mounting plate having a plurality of teeth along one edge thereof slidingly mounted in said trough and above said bottom member and for movement only in a direction parallel to said upstanding side members, the side of said binding mounting plate having the teeth



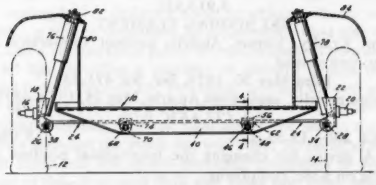
thereon extending into said cut-out means and the bottom surface of said binding mounting plate adjacent said side having said teeth thereon being parallel with the upper surface of said flat leaf spring; and
a flat detent member having teeth on one edge thereof engaging the teeth on said binding mounting plate, said detent member being secured to said flat leaf spring adjacent an end thereof and on the upper side thereof, the plane of said flat detent member being coplanar with the plane of said binding mounting plate having said teeth on an edge thereof, said flat detent member being movable vertically in said cut-out means so that said teeth thereon are moved out of and into engagement with said teeth on said binding mounting plate to facilitate said sliding movement of said binding mounting plate in said trough.

3,913,932

WHEEL SUSPENSION FOR MOTOR VEHICLE

Charles P. Guerriero, Dearborn Heights, and Donald K. Hayward, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 8, 1974, Ser. No. 486,731
Int. Cl.² B60G *11/46*
U.S. Cl. 280—124 A **5 Claims**



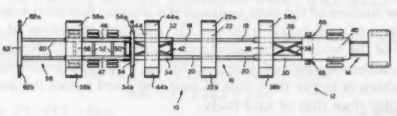
1. An independent rear suspension for a motor vehicle having a vehicle body and left and right non-driving, nonsteerable road wheels;
suspension means interconnecting said vehicle body and said road wheels;
said suspension means including left and right wheel support members rotatably supporting said left and right road wheels about axes of rotation that are fixed relative to said wheel support members;
a transverse leaf spring and means securing said spring to said vehicle body;
left and right outer pivot means connecting the left and right outer ends of said leaf spring to said left and right wheel support members;
said left and right outer pivot means having longitudinal pivot axes that are fixed with respect to the axes of rotation of said left and right wheels, respectively;
left and right upwardly extending telescopic hydraulic shock abosrbers;
said left and right shock absorbers having their lower ends rigidly secured to said left and right wheel support members, respectively;
means pivotally connecting the upper ends of said left and right shock absorbers to said vehicle body;
said transverse spring and said left and right shock absorbers providing the sole means that defines the jounce and rebound path of said left and right wheels.

3,913,933

ADJUSTABLE VEHICLE FRAME

Peter J. Visser, Niles, and Richard C. Miller, Cassopolis, both of Mich., assignors to Clark Equipment Company, Buchanan, Mich.

Filed Dec. 17, 1973, Ser. No. 425,373
Int. Cl.² B62D *21/14*
U.S. Cl. 280—34 A **4 Claims**



1. An adjustable vehicle frame comprising, an elongated intermediate frame section arranged for adjustable connection to other frame sections located adjacent the ends thereof, a second frame section adjustably connected to the said intermediate frame section adjacent one end thereof and arranged for selective reciprocal adjustment longitudinally relative to the intermediate frame section, a third frame section adjustably connected to the said intermediate frame section adjacent the other end thereof and arranged for selective reciprocal adjustment longitudinally relative to the intermediate frame section, the said third frame section including a portion adapted to carry an additional adjustable portion, a plurality of ground engaging wheels secured to the said third frame section, a fourth section adjustably connected to the said third frame section and arranged for selective reciprocal adjustment longitudinally relative to the third frame section, and a plurality of transversely arranged lateral adjusters whereby the width of the frame may be adjusted.

3,913,934

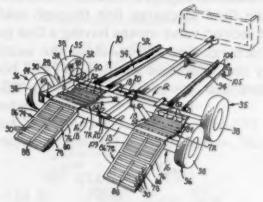
VARIABLE WIDTH HIGHWAY TRAILER

Franklin E. Koehn, P.O. Box 296, Denair, Calif. 95316; Robert N. Esau, 1548 2nd St., Livingston, Calif. 95334, and Le Vern D. Jantz, 6674 N. Cypress St., Winton, Calif. 95388

Filed Feb. 14, 1973, Ser. No. 332,372
Int. Cl.² B62B *11/00*
U.S. Cl. 280—34 A **7 Claims**

1. A variable width trailer comprising: a main frame;
a pair of running gear supports disposed on opposite sides of said main frame, each having running gear thereon disposed in spaced parallel relationship;

a lateral adjustment mechanism interconnected between said main frame and said wheel supports and disposed to vary the spacing between said running gear supports, and said wheel support sub-frame includes a hollow chassis box beam disposed to contain at least a portion of an axle beam with said axle beam pivotally connected to said chassis box beam for limited vertical swinging movement



therein, said chassis box beam being interconnected with the distal end of one of said lateral sub-frames, and said running gear includes tandem wheels rotatably mounted on said axle beam in fore and aft alignment with said longitudinal axis of said wheel support sub-frame; and

load bed means operatively associated with said main frame and disposed to support a load thereon.

3,913,935

COLLAPSIBLE CART

John R. McGillicuddy, Denver, Colo., assignor to Raymond Lee Organization, a part interest

Continuation-in-part of Ser. No. 373,647, June 26, 1973, abandoned. This application Dec. 17, 1974, Ser. No. 532,811

Int. Cl.² B62B *11/00*

U.S. Cl. 280—36 **3 Claims**

1. A collapsible cart comprising:

an elongated U-shaped frame having two parallel legs interconnected by a curved portion integral therewith at one set of ends, the other set of ends forming parallel free ends defining tips extending at an acute angle with the plane of the frame;

first caster means secured to said frame tips;

first and second elongated parallel members, each member being pivotally secured at one end to a corresponding leg of the frame at a corresponding point adjacent but spaced from the curved portion of the frame, the opposite ends of the members being parallel and defining tips which extend at an acute angle with the plane of the members; second caster means secured to said member tips;

a first basket detachably secured to and extending between the frame tips and the member tips;

a second basket;

third means pivotally disposing said second basket between said members and within said frame; and

fourth support means connected between the tips of the frame and detachably securable to an end of the second basket at the bottom thereof.

3,913,936

STEERING TRANSMISSION

J. Stanley L. Thomas, Concord, Calif., assignor to Kelsey-Hayes Company, Oakland, Calif.

Filed May 28, 1974, Ser. No. 473,875

Int. Cl.² B62D *7/14*

U.S. Cl. 280—91 **10 Claims**

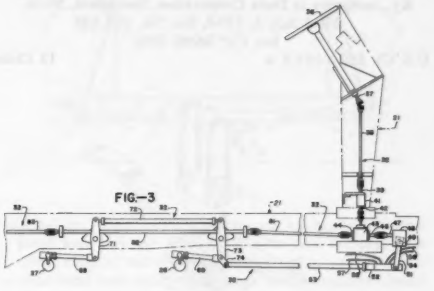


FIG.—3

1. In a steering transmission for use with a transporter-loader or similar vehicle having a steering assembly including a mechanical control linkage formed for selective operation of a set of front wheels and a set of rear wheels in a crab steering mode and at least one regular steering mode, said linkage further including a rotatable input shaft operatively connected to one set of said wheels and a rotatable output shaft operatively connected to a second set of said wheels, said steering transmission including gear means formed for mounting to said steering assembly with an input side thereof connected to said input shaft and an output side thereof connected to said output shaft, and said steering transmission including gear shifting means formed for connection to said steering assembly and formed to sense the positioning of the wheels of said transporter-loader in a substantially parallel straight-ahead orientation, the improvement comprising:

said gear means further including:

i. a shifting element operatively connected to said gear shifting means and mounted to one of said input shaft and said output shaft for rotation therewith;

ii. a first gear element mounted to the remainder of said input shaft and said output shaft for rotation therewith;

iii. a second gear element mounted for rotation freely of both said input shaft and said output shaft; and

iv. an idler gear element mounted in engagement with said first and second gear elements for transmission of power therebetween;

said first gear element and said second gear element each being formed for engagement by said shifting element, and said shifting element being formed for axial movement along the shaft on which it is mounted to and from a first position operatively connected said wheels for movement in a crab steering mode and a second position operatively connecting said wheels for movement in a regular steering mode, said shifting element engaging said first gear element in said first position for rotation of said first gear element and the shaft on which said first gear element is mounted in the said direction as said shaft on which said shifting element is mounted, and said shifting element engaging said second gear element in said second position for rotation of said second gear element in the same direction as said shifting element, and through said idler gear element, for rotation of said first gear element

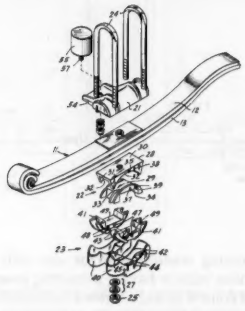
and said shaft on which said first gear element is mounted in a direction opposite to the direction of motion of said shaft on which said shifting element is mounted, said gear shifting means being further formed and connected to move said shifting element to and from said first position and said second position only when the wheels of said transporter-loader are in said straight-ahead orientation.

3,913,937

UNIVERSAL AXLE PAD AND CLAMP ASSEMBLIES FOR VEHICLE SUSPENSIONS

William F. Longworth, and Attila J. Tamas, both of Lexington, Ky., assignors to Dura Corporation, Southfield, Mich.

Filed July 3, 1974, Ser. No. 485,446
Int. Cl.² B60G 9/00
U.S. Cl. 280—104.5 A **11 Claims**



1. A universal axle pad and clamp assembly for connecting leaf spring means in load-supporting relation with an axle housing in a vehicle suspension, comprising:

spring cap means;

spring seat and axle pad means including a spring seat member and an axle pad adapter relatively adjustably engagedly related;

a pair of spaced axle clamp members and a pair of complementary axle clamp adapters relatively adjustably engaged with said axle clamp members;

and a pair of U-bolts for securing the spring cap, the spring seat and axle pad means and the pairs of engaged axle clamp members and clamp adapters in fixed clamped relation to spring means received between said cap and spring seat member and an axle housing received between said axle pad adapter and said axle clamp adapter.

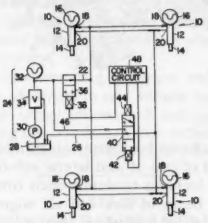
3,913,938

SELF-LEVELLING VEHICLE SUSPENSION SYSTEM

Hiroshi Aikawa, Tokyo, and Naganori Ito, Higashikurume, both of Japan, assignors to Nissan Motor Company Limited, Yokohama, Japan

Filed July 3, 1974, Ser. No. 485,451
Claims priority, application Japan, July 4, 1973, 48-74687
Int. Cl.² B60G 11/26
U.S. Cl. 280—112 A **4 Claims**

1. In a self-levelling suspension system for an automotive vehicle including at least one hydropneumatic suspension unit actuated by a fluid pressure for adjusting the vertical position of the suspended portion of the vehicle body, an operating fluid supply line for providing communication between the suspension unit and a source of operating fluid for feeding the operating fluid to the suspension unit from the fluid source when open, a fluid discharge line which leads from the suspension unit for discharging the fluid from the suspension unit when open, a first valve means disposed in the fluid supply line for shutting off the fluid supply line when actuated, a second valve means disposed in the fluid discharge line for shutting off the fluid discharge line when actuated, and control means responsive to side roll of the vehicle body for actuating the first and second valve means to close the fluid supply and discharge lines in response to a vehicle roll angle larger than a predetermined limit, the improvement that said second valve means has first and second valve actuating means and which further comprises an auxiliary operating fluid supply line for providing communication between the source of the operating fluid and the fluid discharge line through said second valve means, said second valve means having a first position to open the fluid discharge line and to close the auxiliary operating fluid supply line, a second position to close both of the fluid discharge line and the auxiliary operating fluid supply line,



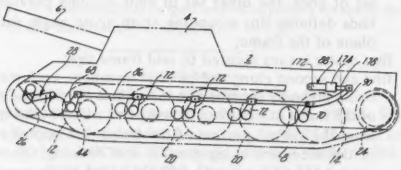
and a third position to close the fluid discharge line and to provide communication between the fluid discharge line and the auxiliary operating fluid supply line, the second valve means being in the first position when both of the first and second valve actuating means are inoperative, in the second position when the first valve actuating means is actuated, and in the third position when the second valve actuating means is actuated, and said control means responsive to side roll of the vehicle body and including a switch means having a first position to enable the first valve means and the first valve actuating means of the second valve means to be actuated in response to vehicle roll angle larger than a predetermined limit and a second position to actuate the second valve actuating means of the second valve means.

3,913,939

VARIABLE HEIGHT AND VARIABLE SPRING RATE SUSPENSION SYSTEM

Alex H. Sinclair, Southfield, and Robert J. Otto, Grosse Pointe Woods, both of Mich., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 2, 1973, Ser. No. 376,023
Int. Cl.² B60G 25/00
U.S. Cl. 280—124 F **12 Claims**



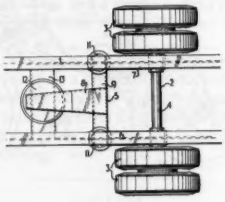
1. In a vehicle, a wheel suspension system comprising an elongated device including coaxial tube and bar torsion elements joined at one end and relatively angularly displaceable at the other end and having:

a. means to rotate the joined ends to vary vehicle height
i. in an infinite number of increments, and
ii. throughout a range between maximum vehicle height and minimum vehicle height; and
b. means operative throughout at least part of said range and responsive to vehicle load to vary the spring rate of the suspension means including a two-element lost-motion device of which one element engages the torsion tube and the other element engages the torsion bar.

3,913,940
VEHICLE SUSPENSIONS

Gregory John Bates, Whetstone, England, assignor to Dunlop Limited, London, England

Filed May 29, 1974, Ser. No. 474,185
Claims priority, application United Kingdom, May 29, 1973, 25531/73
Int. Cl.² B60G 11/62
U.S. Cl. 280—124 R **8 Claims**



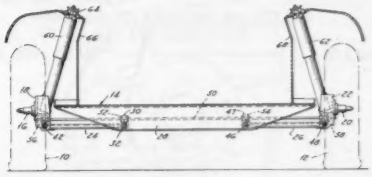
1. A vehicle suspension for supporting a vehicle body upon a wheel and axle set comprising a Y-shaped lever frame having three limbs for location substantially horizontally beneath the vehicle body, the frame being attached at the ends of two of its limbs to the axle set and the other limb extending substantially longitudinally of the vehicle, a pair of main springs attached to and spaced-apart transversely of the frame each adapted for acting substantially vertically between the vehicle body and a point on the frame intermediate its ends, an air spring of substantially lower rate than the main springs attached to the other limb and adapted for connection to the vehicle body, and a sensor for sensing the static height of the air spring and controlling the supply of air to the air spring whereby when the suspension is attached to a vehicle static suspension deflection is determined largely by the higher rate main springs and dynamic suspension deflection is largely determined by the lower rate air spring, the lever frame pivoting about an axis between the air spring and the main springs.

3,913,941
INDEPENDENT REAR SUSPENSION FOR MOTOR VEHICLES

Charles P. Guerriero, Dearborn Heights, and Donald K. Hayward, Dearborn, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 8, 1974, Ser. No. 486,732
Int. Cl.² B60G 11/46
U.S. Cl. 280—124 A **6 Claims**

1. An independent rear wheel suspension system for a motor vehicle having front wheel drive,
said suspension system including a vehicle body structure, left and right road wheels and suspension means interconnecting said body structure and said road wheels,
said suspension means comprising left and right wheel support members,
said left and right members rotatably supporting said left and right wheels for rotation about transverse axes that are fixed relative to said left and right wheel support members, respectively,
left and right laterally extending suspension arms,
left and right inner pivot means connecting said left and right suspension arms to said body structure,
said left and right inner pivot means having longitudinal pivot axes that are fixed with respect to said body structure,
left and right outer pivot means connecting said left and right suspension arms to said left and right wheel support members,

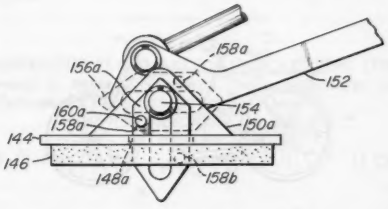


said left and right outer pivot means having longitudinal pivot axes that are fixed relative to said left and right wheel support members, respectively,
a transverse leaf spring and inner spring support means connecting said spring to said body structure,
left and right outer spring support means connecting the outer ends of said transverse leaf spring to said left and right wheel support members,
left and right telescopic hydraulic shock absorbers,
said left and right shock absorbers having their lower ends rigidly secured to said left and right wheel support members,
said left and right shock absorbers having their upper ends pivotally connected to said body structure.

3,913,942
STABILIZER PAD FOR EARTH-MOVING APPARATUS

Robert A. MacKenzie, 181 Morton St., Stoughton, Mass. 02072, and Andry Lagsdin, 63 Chard St., East Weymouth, Mass. 02169

Continuation-in-part of Ser. No. 342,684, March 19, 1973. This application Aug. 24, 1973, Ser. No. 391,043
Int. Cl.² B60S 9/02
U.S. Cl. 280—150.5 **7 Claims**

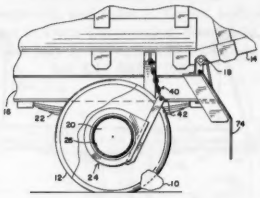


1. For an earth moving apparatus having at least one support arm, a stabilizer pad comprising a plate-like piece having a resilient surface, means supporting said piece to an end of said arm, said piece being pivotable about said support means, the angle of rotation of said piece being at least a predetermined small angle, said piece having means defining a pivot axis fixed relative to said arm, at least one cleat and means supporting said cleat for rotation about said pivot axis wherein said cleat may be rotated to a downwardly facing terrain engaging position.

3,913,943
ROCK EJECTING AND SUSPENSION LIMITING ARRANGEMENT FOR DUAL WHEELED VEHICLES

James C. Tamburino, Roselle, and Lawrence A. Venere, Wood Dale, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Aug. 19, 1974, Ser. No. 498,360
Int. Cl.² B60S 1/68
U.S. Cl. 280—158 A 3 Claims



1. A rock ejecting and suspension limiting arrangement for a dual wheeled vehicle with a frame, axles resiliently attached to said frame, a plurality of pairs of steerable and non-steerable dual wheel assemblies operably mounted on said axles with wheel spacers laterally separating said wheels in each pair, said arrangement comprising, in combination:

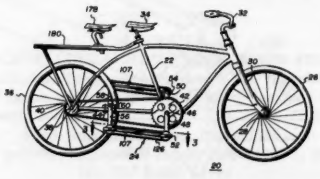
rock ejecting means rotatably mounted on and axially centered on said wheel spacer, having a connecting aperture outside the outer diameter of said wheel assembly and capable of limited pivotal motion about said axle for ejecting material trapped between said wheels of each said pair of wheels and limiting the vertical motion of said axle with respect to said frame whereby the vertical deflection of said resilient mounting of said axles is limited; a support rigidly attached to said frame; and

restraining means operably attached to said support and said rock ejecting means for limiting said pivotal motion of said rock ejecting means about said axle and said vertical motion of said axle with respect to said frame.

3,913,944
SUPPLEMENTAL PEDALLING MECHANISM FOR BICYCLES

James H. Blow, Jr., 23 Palisade Ave., Piscataway, N.J. 08854

Filed June 18, 1974, Ser. No. 480,372
Int. Cl.² B62K 13/00
U.S. Cl. 280—231 13 Claims

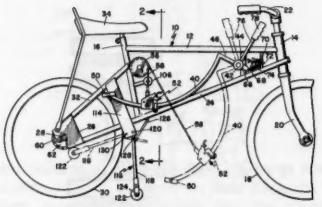


1. A bicycle construction comprising: a bicycle frame having at least one driving wheel; a main crank arm having a first end rotatable on said frame and a second end having a pedal rotatable thereat; drive means connecting said main crank arm to said driving wheel; a supplemental crank arm having a first end and a second end; support means selectively positionable on said fram generally intermediate said main crank arm and the axis of said driving wheel, said supplemental crank arm first end being rotatably coupled to said support means; a supplemental pedal rotatable on sais supplemental crank arm second end; a connecting rod having one end coupled to said supplemental crank arm second end and the other end coupled to said main crank arm second end; first gear means coupled to said supplemental crank arm second end for corresponding movement therewith; second gear means coupled to said main crank arm second end for corresponding movement therewith; and means coupling said first gear means to said second gear means to maintain corresponding orientation between said supplemental crank arm and said main crank arm as said main crank arm is rotated about its first end.

3,913,945
BICYCLE WITH VARIABLE SPEED LEVER ACTION DRIVE

Marion A. Clark, 546 W. Pleasant, Tulare, Calif. 93274

Filed May 1, 1974, Ser. No. 465,885
Int. Cl.² B62M 1/04, 23/00
U.S. Cl. 280—233 5 Claims



1. In a bicycle having a frame with a forward end portion, and a rear portion with a driven rear wheel mounted therein, a variable speed lever action drive mechanism comprising:

a pair of pedal levers having forward ends with pivotal attachment to the frame at the forward end portion to swing substantially vertically on opposite sides of the frame, said levers extending rearwardly and having foot pedals at the rear ends thereof;

said rear wheel having a pair of sprockets, with individual one way clutches coupled to drive the wheel in a forward direction;

a shift unit slidably mounted on each of said levers;

a drive chain passing around each of said sprockets;

said frame having guide pulleys rotatably mounted on the rear portion thereof;

each of said chains having a cable extending from one end and over one of the guide pulleys to the respective shift unit, and a return spring connected between the frame and the other end of each chain to bias the respective lever upwardly;

said frame having tubular portions in which said return springs and portions of said chains and cables are enclosed.

3,913,946
REAR WHEEL DRIVE FOR A TRICYCLE

Henry L. Valentine, 1120 Toedtli Drive, Boulder, Colo. 80303, and Louis A. Valentine, 11444 E. 4th, Aurora, Colo. 80010

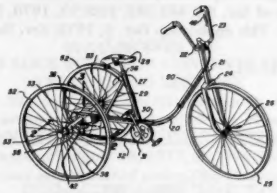
Filed July 3, 1974, Ser. No. 485,550
Int. Cl.² B62M 9/00
U.S. Cl. 280—236 7 Claims

1. In a tricycle formed upon a generally tubular frame, of the type having a front steering wheel, a pair of rear drive wheels, a rider's seat therebetween and a pedal drive below the rider's seat including a drive chain extending rearwardly therefrom, the improvement comprising:

a. a single, transversely disposed drive shaft carried in frame bearings with each end connecting with a rear wheel to normally drive both rear wheels in unison,

b. a sprocket means at the shaft including a sprocket on the shaft at the center portion thereof and connected with the aforesaid drive chain to rotate responsive to operation by the pedal drive,

c. a bearing means connecting each rear wheel to the drive shaft including a one-way bearing to permit the drive shaft to engage with the wheel whenever the shaft is being driven forwardly and to permit the wheel to rotate forwardly ahead of the drive shaft whereby one rear wheel may rotate faster than the other when the tricycle is turning; and



d. a box-like housing at the rear portion of the tricycle framework encasing a portion of the drive shaft and the sprocket mounted thereon, with the upper reach of the drive chain extending from an opening near the top of the housing and the lower reach of the chain extending from below the housing.

3,913,947

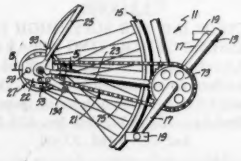
VEHICLE WITH VARIABLE SPEED TRANSMISSION

Trevor L. Harris, Costa Mesa, Calif., assignor to Harris Dynamics, Costa Mesa, Calif.

Filed June 17, 1974, Ser. No. 479,797

Int. Cl.[2] B62M *1/04, 1/06*

U.S. Cl. 280—236 **22 Claims**



1. A vehicle adapted to move along a supporting surface comprising:

a frame;

at least one wheel, said wheel having a centrally located hub;

first means cooperable with the hub for mounting the wheel on the frame for rotational movement relative to the frame about a first rotational axis, said wheel being adapted to roll along the supporting surface;

an inner rotatable member at least partially within said hub;

second means for mounting said inner rotatable member for rotational movement about a second rotational axis, said inner rotatable member and said hub being relatively movable along a path having a radial component to permit adjustment in the relative radial position of the first and second rotational axes;

drive means including at least one one-way clutch and at least one drive element for drivingly coupling said inner rotatable member to said hub, said one-way clutch and said drive element being within said hub, said drive element being drivable along a path which circumscribes the inner rotatable member;

means for imparting input motion to at least one of said hub and said inner rotatable member; and

means operable by the operator of the vehicle for adjusting the relative radial position of said rotational axes whereby the drive ratio between said hub and said inner rotatable member can be varied by the operator.

3,913,948

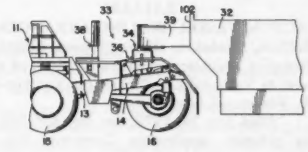
CONVERSION ARRANGEMENT FOR A DUMP TRUCK

James E. Gee, Washington; Alfred W. Sieving, and David T. Ping, both of Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed June 10, 1974, Ser. No. 477,761

Int. Cl.[2] B62D *53/06*

U.S. Cl. 280—415 R **10 Claims**



1. In a tractor-type off-the-highway vehicle having an operator cab mounted on a chassis, fore and aft wheels rotatably mounted on said chassis, an engine and drive train connected to said wheels for propelling said vehicle over rough terrain, in combination with means for converting said wehicle from use as a dump truck to use as a tractor for a semitrailer, said means comprising a mounting platform secured to said chassis after the dump-type body has been removed, said mounting platform having a support portion extending between parallel side frame members of said chassis, flange means on the ends of said support portion and resting on said side frame members, means for securing said flange means to said side frame members, a pair of inwardly projecting aligned stub shafts carried by said support portion, a saddle support pivotally mounted on said stub shafts, a tubular member carried by the opposite end of said saddle support and having an axis extending transverse to the axis of said stub shafts, a vertically disposed kingpin having downwardly extending yoke means straddling said tubular member, a pivot pin passing through said yoke means and said tubular member for pivotally mounting said kingpin for movement about the axis of said tubular member, and a gooseneck member on said semitrailer encircling said kingpin for movement about the vertical axis of said kingpin.

3,913,949

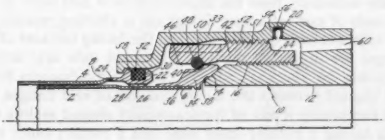
SHROUDED FLAMMABLE FLUID CARRYING TUBE

Clement A. Senatro, Newington, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 8, 1974, Ser. No. 522,377

Int. Cl.[3] F16L *19/02*

U.S. Cl. 285—14 **12 Claims**



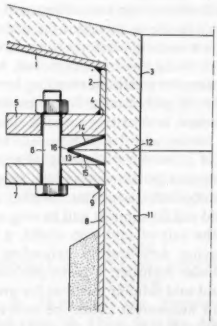
1. An attachment for a shrouded tube, the latter including an inner pressure carrying tube and an outer containment tube, the attachment including a coupling having a central opening therein with

a seating surface at one end thereof,
a concentric threaded surface surrounding the seating surface,
an inner end member on the inner tube having a seating surface cooperating with the seating surface on the coupling,
an outer end member on the outer tube, said outer end member surrounding the inner tube and in spaced relation to the end member thereon,
an inner coupling nut engaging said inner end member and said inner threaded surface and holding the sealing surfaces in contact, said inner coupling nut having a threaded outer surface, and
an outer coupling nut engaging said outer end member and said outer threaded surface and holding said outer end member in position.

3,913,950
VACUUM VESSEL SEALING ARRANGEMENT

Erich Höffken, Dinslaken; Dieter Pflipsen, Rheinkamp-Baer', and Hansjörg Trenkler, Dinslaken-Hiesfeld, all of Germany, assignors to Vacmetal Gesellschaft fur Vakuum-Metallurgie GmbH, Dortmund, Germany

Filed Jan. 24, 1974, Ser. No. 436,208
Claims priority, application Germany, Feb. 1, 1973, 7303698
Int. Cl.² F16L 9/14
U.S. Cl. 285—55 **5 Claims**

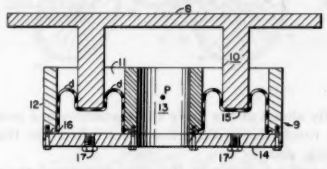


1. In a vacuum vessel for metallurgical use, a lead-in pipe connected to the vessel, a refractory lining on the interior of said lead-in pipe, a feed pipe connected to said lead-in pipe, a refractory lining on the interior of said feed pipe, a flange sealingly secured to and extending radially outwardly from each of said lead-in pipe and feed pipe, bolts clamping said flanges together, wherein the improvement comprises a sealed joint securing said lead-in pipe and feed pipe together comprising that said flanges are located on the adjacent ends of said pipes at the joint and means sealing securing said flanges on said ends of said pipes, said refractory lining extending axially outwardly from the adjacent ends of said pipes so that the ends of said refractory linings are in abutting relation and the adjacent ends of said pipes and the facing surfaces of said flanges are in spaced relation, a vacuum tight seal laterally enclosing the abutting end surfaces of said refractory linings and located between the facing surfaces of said flanges, said seal comprising a pair of frustoconically shaped sealing rings each having a radially inner edge and a radially outer edge, one of said sealing rings sealingly welded at its radially inner edge to said flange on said lead-in pipe with its radially outer edge spaced axially from said flange on said lead-in pipe toward and spaced from said flange on said feed pipe, the other one of said sealing rings sealingly welded at its radially inner edge to said flange on said feed pipe with its radially outer edge spaced axially from said flange on said feed pipe toward and spaced from said flange on said lead-in pipe, and the radially outer edges of said sealing rings being sealingly welded together.

3,913,951
UNIVERSAL JOINT EMPLOYING A FLUID BEARING

Clarence A. LeFebvre, Jr., San Jose, Calif., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 482,203, June 22, 1970, Pat. No. 3,698,192. This application Oct. 5, 1972, Ser. No. 295,415
Int. Cl.² F16L 27/10
U.S. Cl. 285—223 **6 Claims**

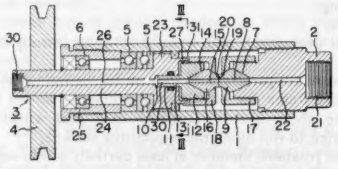


1. A joint for permitting relative angular deflection of two members comprising, in combination:
a. a first member including two concentric annuluses having annular receptacle means provided therebetween,
b. a second member having annular plug means provided thereon, said plug being received within said receptacle means, and
c. fluid supported deformable membrane means disposed within said receptacle means, and maintaining the adjacent surfaces of said plug means and receptacle means in spaced apart relationship, said membrane means in spaces between the adjacent side surfaces of said plug and receptacle means being in the form of reentrant convolutes.

3,913,952
ROTARY COUPLING FOR SUPERHIGH HYDRAULIC PRESSURE GENERATING APPARATUS

Tokio Matsui, and Tateo Katayama, both of Oziya, Japan, assignors to Riken Seiki Kabushiki Kaisha, Oziya and Riken Kiki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Jan. 23, 1974, Ser. No. 435,727
Int. Cl.² F16L 27/00
U.S. Cl. 285—281 **8 Claims**



1. A fluid connector for use with a pressure-generating apparatus, comprising a hollow cylinder-shaped casing, a first connecting member fixed to one end of the casing and having a front end thereof adapted to be connected to a pressure generating apparatus, a second connecting member rotatably mounted on the casing adjacent the other end thereof and having a front end portion formed with an enlarged hole and a rear end portion adapted to be connected to an injection nozzle, a receiving member positioned within the casing and having a plunger portion axially slidably received within the

enlarged hole formed in the front end portion, means nonrotatably connecting said receiving member to said second connecting member, the first and second connecting members and the receiving member having passages therethrough and in communication with one another to provide for flow of fluid, and the first connecting member having a rear seal face maintained in a relatively rotatable abutting engagement with a front seal face formed on the receiving member for creating a sealed relationship between the receiving member and the first connecting member.

3,913,953
TWIST LOCK JOINT FOR CONCRETE FILLED, TELESCOPING SECTIONS

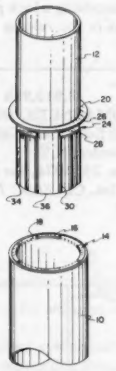
Bill Archer, Meridian, and Low, III: John Lewis, Laurel, both of Miss., assignors to Arlo, Inc., Meridian, Miss.

Continuation of Ser. No. 229,382, Feb. 25, 1972, abandoned. This application July 18, 1973, Ser. No. 380,312

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] F16L *13/10*

U.S. Cl. 285—290 **6 Claims**



1. In a column of the type formed from a plurality of interlocking sections stacked with respect to each other and rigidized by pumping of fluid concrete therein, a joint comprising:

A. an outer telescoping section filled with concrete and having:

i. an inwardly extending stop ring secured to its top with at least three radially inwardly extending flanges defining intermediate peripheral slots;

B. an inner telescoping section filled with concrete, having:

i. an outwardly extending peripheral vertical support band secured adjacent its bottom, such that said support band and said stop stop ring abut each other, as said sections are stacked with respect to each other; and

ii. at least three radially outward extending flanges, positioned beneath said support band, so as to be registrable and said stop ring peripheral slots during stacking of said sections and lockingly engageable with and under said stop ring inwardly extending flanges upon twisting of said inner section with respect to said outer section; and

iii. at least three longitudinally extending splines positioned under the said flanges, so as to align said inner section with respect to said outer section, concrete filling the vertical interstices defined by said splines between portions of said sections adjacent said stop ring and locking band; and

iv. said splines being further characterized as having a greater outside diameter than said flanges.

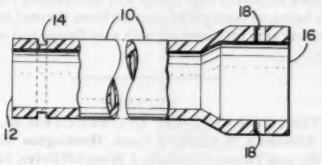
3,913,954
PIPE LOCKING DEVICE

Fred Klimpl, 18 Marmon Terrace, West Orange, N.J. 07052

Continuation of Ser. No. 279,640, Aug. 10, 1972, abandoned. This application Jan. 16, 1974, Ser. No. 433,872

Int. Cl.[2] F16L *37/14*

U.S. Cl. 285—305 **23 Claims**



1. An assembly comprising:

a. identical, coaxial first and second, tubular members each having male and female end portions;

b. a radially outward facing, circumferential and axially widened groove defined by an axially extending base wall and a pair of axially spaced apart radial side walls formed on the outer surface of both said tubular members proximate the male end thereof;

c. two pairs of aligned holes formed through the wall of both said tubular members proximate the female end thereof, whereby said male end is telescoped into said female end in the assembled condition, said two pairs of aligned holes being substantially tangential to the inside diameter of said tubular members, one pair of said aligned holes being axially offset from said other pair of aligned holes; and

d. rigid key means positioned in each said pair of aligned holes, said key means having a straight leg portion traversing at least a portion of said groove in a chordal direction with respect to the longitudinal axis of said tubular members, with said leg portion being under tension in the assembled condition, said key means being in tangential contact with the base wall of said groove and in chordal contact with the side walls of said grooves, said key means being sized and shaped to substantially fill said holes in which they are positioned to thereby prevent passage of contaminants through said holes and to require the application of a radially directed force to said key means to effectuate the removal thereof in chordal contact with the side walls of said groove.

3,913,955
SEALED COUPLING FOR EXHAUST PIPE SECTIONS

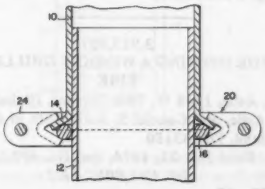
Mohindar Singh Teja, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed July 5, 1973, Ser. No. 376,799

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] F16L *17/00, 19/00, 21/02*

U.S. Cl. 285—337 **6 Claims**



1. A tubing assembly comprising: a first tube section having a central longitudinal axis and including an end portion flared radially and axially outwardly relative to said axis and thus

forming an annular flange; a second tube section having an end portion telescopically received in said first tube section; said annular flange cooperating with said second tube section to define an annular, axially opening recess; a metal sealing ring being partially received in said recess and tightly embracing said second tube section; said sealing ring being split so as to define opposed overlapped ends engaged at an interface extending substantially tangential to an inner surface location of the ring; a clamping ring having an annular inwardly opening groove receiving said flange and said sealing ring; and said groove being so configured that surfaces thereof act to wedge said sealing ring into contact with said flange and second tube section.

3,913,956

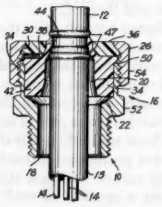
FITTING FOR CONDUIT AND ELECTRICAL CABLE

Jonah Eidelberg, 8 Clafford Lane, Huntington Station, N.Y. 11746, and Thomas Mooney, 4 Westcliff Drive, Mount Sinai, N.Y. 11766

Continuation of Ser. No. 194,969, Nov. 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 89,303, Nov. 11, 1970, abandoned. This application June 4, 1973, Ser. No. 366,657

Int. Cl. H02g *3/00*

U.S. Cl. 285—343 **4 Claims**



1. A fluid-tight strain relief fitting for connection with the end of a generally non-compressible cable, comprising a generally tubular body having an internal bore extending into said body and passing therethrough, a bushing telescopically received within said bore and having a through bore for receiving said cable and including a base portion nesting within said body and sleeve of reduced wall thickness extending beyond said body and terminating at its free end in an inwardly directed peripheral lip, a ring coaxially abutting said sleeve free end, a flexible bendable strip interconnecting said ring and said base portion, said bushing being made of a rigid plastic material, and means cooperating with said body for longitudinally urging said ring toward said base portion thereby circumferentially permanently contracting and elongating said sleeve between said ring and the outer surface of said cable and into sealing contact with the outer surface of said cable and thereby causing annular contraction of said sleeve about said cable to form a fluid-type seal with the cable and body, and to positively grip said cable.

3,913,957

DEVICE FOR OPENING A WINDOW GRILLE IN CASE OF FIRE

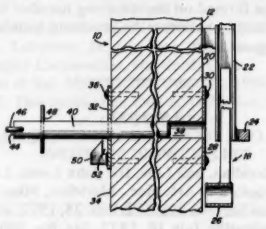
Georges P. Astie, 1248 W. 78th Terrace, Hialeah, Fla. 33120; Jean J. Astie, and Gabriel S. Astie, both of 6899 N.W. 7th Ave., Miami, Fla. 33150

Filed July 22, 1974, Ser. No. 490,870

Int. Cl.² E05C *5/02*

U.S. Cl. 292—57 **10 Claims**

1. A releasable locking device for an externally mounted member retained in a bracket fixed exteriorly to a wall structure, comprising an axially slidable, rotatable shaft extending through an opening in the wall structure and having opposite ends, a socket fixed to said externally mounted member receiving one of said ends of the shaft exteriorly of the wall structure, a handle connected to the shaft adjacent the other end interiorly of the wall structure, a lock element fixed to the shaft interiorly of the wall structure and having a single angu-



lar release position, and hook means secured to the wall structure in overlying relation to the lock element for preventing axial withdrawal of the shaft from the opening in the wall structure except in the release position of the lock element, said lock element comprising a lock plate having a slot aligned with the hook means in the release position of the lock element.

3,913,958

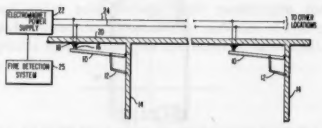
ELECTROMAGNETIC DOOR HOLDER

Carl M. Larime, Fairfield, Conn., assignor to General Signal Corporation, Rochester, N.Y.

Filed Jan. 25, 1974, Ser. No. 436,774

Int. Cl.² E05C *19/16*

U.S. Cl. 292—251.5 **4 Claims**



1. In an electromagnetic door holder for retaining a door in an open position and being of the type which comprises an electromagnetic flux generating means and an armature one of which is secured to the door while the other is disposed at a selected position, the improvement comprising:

said armature means comprising a bracket and an armature element supported on said bracket by a pivotal support means,

said pivotal support means including a bifurcated portion having axially aligned apertures in its opposed leg portions and also including an apertured flange disposed between said leg portions,

a bolt passing through said aligned apertures and means for adjusting the position of said bolt axially relative to said opposed leg portions,

a pair of bushings each having at least in part a generally spherical portion and respectively disposed on opposite sides of said flange,

each bushing being secured to one of said two members while its part spherical portion bears against and rotates relative to the other said member to permit thereby substantially unrestricted rotation of said flange in any direction relative to said bracket over at least a predetermined range of motion,

said bolt adjusting means comprising a threaded end portion of said bolt which threadably engages with one of said opposed leg portions and further including means on said bolt which is forcibly urged against one of said bushings

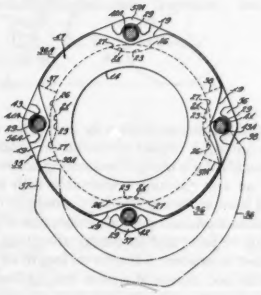
as said bolt is threaded into said one opposed leg portion, said bolt adjusting means controlling the frictional restraining force exerted between said flange and said opposed leg portions through said bushings.

3,913,959

FLANGE CLAMP FOR AN INSULATING WEATHERPROOF ENCLOSURE

Oscar L. Larkin, Jackson, Miss., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed May 28, 1974, Ser. No. 473,810
Int. Cl.² E05C *19/18*
U.S. Cl. 292—256.6 3 Claims



1. In clamping apparatus for securing an electrical device to a supporting device;

an insulating weatherproof cylindrical envelope adapted to be mounted on the supporting structure;

a radially outwardly extending flange formed integrally with said envelope in position thereon to be disposed adjacent to the supporting structure on which said envelope is mounted, said flange being constructed to present a sloping top surface which slopes downwardly and outwardly from the cylindrical body of said envelope;

a pair of identical C-shaped clamping members cooperatively arranged on said flange of said envelope in facing relationship;

each of said C-shaped clamping members being constructed with a sloping undersurface complementary to the sloping top surface of said flange, each of said C-shaped clamping members also having their end portions relieved in a manner that one end portion of each C-shaped member has the undersurface relieved, the arrangement being such that the relieved adjacent end portions of said C-shaped clamping member mate to provide an interengagement between the adjacent ends of said C-shaped clamping members when said C-shaped clamping members are arranged in operative position on said flange; and,

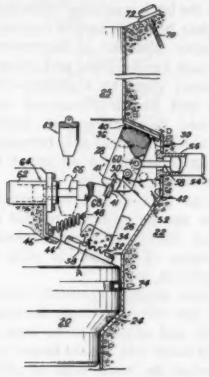
a plurality of bolt members operatively engaged in the supporting structure and connected to said C-shaped clamping members, said plurality of bolt members being operable to effect the forceful engagement of said C-shaped clamping members with said flange in a manner that said C-shaped clamping members apply an equalized clamping force on the entire surface of said flange to effectively secure the envelope in position on the supporting structure.

3,913,960

CLAMPING SYSTEM FOR THE LID OF A PRESSURIZED ENCLOSURE

Didier Costes, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 5, 1974, Ser. No. 440,135
Claims priority, application France, Feb. 6, 1973, 73.04170
Int. Cl.² B65D *45/30*
U.S. Cl. 292—256.65 5 Claims



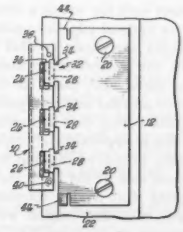
1. A system for clamping two components by separating two substantially parallel flat surfaces which are placed in oppositely facing relation and each of which forms part of one of said components, wherein said system comprises two compression struts or "toggle arms" provided with a rolling zone at each end, said toggle arms being applied in contact with each other by means of one of the rolling zones thereof and being applied respectively against the two aforementioned surfaces by means of the second rolling zones, the radii of curvature of said rolling zones in the rolling plane being longer than the half-length of each aforementioned toggle arm, and a system for exerting lateral thrust on at least one of said toggle arms, each toggle arm being provided with means for producing displacement in rolling motion without sliding with respect to each other and with respect to the adjacent one of said flat surfaces.

3,913,961

LATCH IMPROVEMENTS

Thomas J. Dugan, 2501 El Camino Real, #206, San Clemente, Calif. 92672

Filed May 10, 1974; Ser. No. 469,025
Int. Cl.² E05C *3/04*
U.S. Cl. 292—290 4 Claims



1. A latch for a swinging closure such as a door, having a vertical edge which faces an upright jamb in closed position comprising:

a keeper plate and a striker plate arranged edge to edge, said keeper plate having a rear side for seating against said jamb and an opposite outer side,

hinge means pivotally connecting said plates along their adjacent edges for swinging of said striker plate relative to said keeper plate on the hinge axis and endwise movement of said striker plate relative to said keeper plate along the hinge axis,

means for securing said keeper plate to the door jamb with said rear side seating against the jamb and said hinge axis vertical, whereby said plates have edges which are lower edges and opposite edges which are upper edges when the latch is secured to the jamb,

said striker plate being swingable beyond said outer side of said keeper plate to a closure-engaging position relative to said keeper plate and toward said rear side of said keeper plate to a closure-releasing position relative to said keeper plate, and said striker plate when in said closure-engaging position being vertically movable along said axis between a lower striker plate locking position and an upper striker plate unlocking positions, coacting means on said plates which engage in said locking position to lock said striker plate against swinging to said closure-releasing position and disengage in said unlocking position to permit swinging of said striker plate to said closure-releasing position, and

said keeper plate having a manually bendable tab portion defined by slot means opening through an edge of the keeper plate and adapted to be bent so as to project beyond said outer side of said keeper plate at a position which is below the lower edge of said striker plate at least when the latter plate is in said locking position to prevent raising of said striker plate to unlocking position and rotation of the striker plate to closure releasing position by insertion of an implement between said jamb and closure edge.

3,913,962

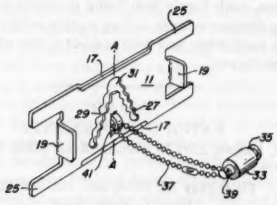
PORTABLE DOOR LOCK

Kenneth H. Briggs, 2133 Eunice St., Berkeley, Calif. 94707

Filed Aug. 31, 1967, Ser. No. 664,764

Int. Cl.[2] E05C *19/18*

U.S. Cl. 292—292 **3 Claims**



1. A portable door lock for use in a door assembly having a door hinged at one vertical edge for unidirectional opening, a door jamb adjacent the other vertical edge, and a latch recess in said jamb, the securer comprising

a relatively thin metal base plate for fitting between the edge of the door and the adjacent jamb when the door is closed, said plate having first and second ends,

a tongue projecting at approximately right angles from each end of said plate in spaced relation thereto for fitting in and engaging the side of the latch recess in said jamb,

a pair of elongated slots having serrated edges formed in said base plate, said slots angled with respect to each other and forming an inverted "V" and having an enlarged opening at their common ends,

a bolt having an annular groove around one end thereof for mating with the serrated edges of either of said slots in positively engaged and selective sliding relation for adjustment therealong and wedging against said door when it is closed, and

the ends of said plates adjacent said tongues forming stabilizing projections on both sides of said tongues, said projections spaced to permit a spring latch deadlock to fit therebetween.

3,913,963

SHOCK OR ENERGY ABSORBING APPARATUS

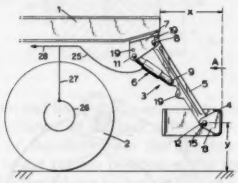
Gunter Persicke, Dartford, England, assignor to Road Research Limited, Gravesend, England

Filed Aug. 5, 1974, Ser. No. 494,999

Claims priority, application United Kingdom, Aug. 14, 1973, 38405/73

Int. Cl.[2] B60R *19/02, 21/14*

U.S. Cl. 293—15 **9 Claims**



1. A shock absorbing apparatus for use on heavy load carrying vehicles having a chassis mounted on road wheels, said apparatus comprising a bumper extending across the width of the vehicle, an arm pivotally mountable with respect to the vehicle, said bumper being pivotally mounted on the end of said arm remote from said pivotal connection of said arm with respect to said vehicle, and an energy absorbing device pivotally articulated at spaced points in its length to said arm and with respect to said chassis at a point spaced from said pivotal connection between said arm and said chassis, said energy absorbing device being operable in response to a force with a momentum in excess of a predetermined value to permit movement of said arm to cause displacement of said bumper in a direction having a horizontal component.

3,913,964

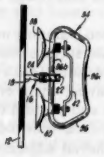
APPARATUS AND SYSTEM FOR GAINING ACCESS TO CONFLAGRATIONS

John R. Lukeman, 3017 Hemingford Lane, Oklahoma City, Okla. 73120

Continuation-in-part of Ser. No. 322,953, Jan. 12, 1973, Pat. No. 3,831,991. This application Aug. 26, 1974, Ser. No. 500,288

Int. Cl.[2] A47F *7/00*

U.S. Cl. 294—64 R **7 Claims**



1. Apparatus for gaining access to conflagrations comprising:

a mounting plate having a monoplanar surface and adapted for securement to a vertically extending surface with the mounting plate positioned on the vertically extending surface with the monoplanar surface of the mounting plate extending substantially parallel to the vertically extending surface;

a bracket secured to the monoplanar surface of the mounting plate and projecting outwardly therefrom in a direction substantially normal to the monoplanar surface of the mounting plate, said bracket including a pair of arms defining a throat therebetween;

a panel lifting tool including:

a handle having a portion extending substantially parallel to said monoplanar surface;

panel engaging means carried by said handle adjacent one end thereof and having:

a panel engaging portion; and

a base portion disposed at the junction of the panel engaging means with said handle, and positioned in said throat with said arms on opposite sides thereof, said tool being supported on said bracket with said panel engaging portion positioned between said mounting plate and said handle.

3,913,965

CARRYING FRAME FOR GIANT GLASS SHEETS

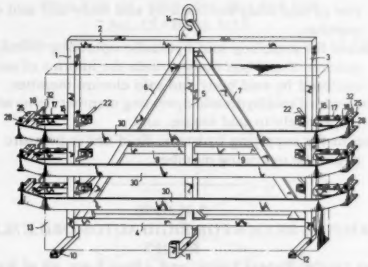
Ernst Muller, Porz, and Dragan Popovic, Merkstein, both of Germany, assignors to Erste Deutsche Floatglas GmbH. & Co., Aachen, Germany

Filed June 29, 1973, Ser. No. 375,036

Claims priority, application Germany, July 12, 1972, 2234124

Int. Cl.[2] B66C *1/22*

U.S. Cl. 294—67 R **5 Claims**



1. A carrying frame for the transport of thin giant glass sheets in a vertical position, the frame having means for connecting it to a hoist and members having their forward faces arranged in a common generally vertical plane to form a generally vertical support for engaging one face of the glass, said frame also having carrying members at the lower end thereof projecting outwardly from said vertical support upon which the bottom edges of the glass can rest, said frame characterised in that a holding member is provided at each end of said frame and means securing said holding members to said vertical support; said holding members being adjustable in length for extension and contraction parallel to the plane of said vertical support; the ends of said holding members projecting outwardly from the plane of said vertical support in the same direction as said carrying members; glass engaging means on each of said holding members adapted to wrap around the edges of the glass sheets and to grip the edge portions of the forward face of the glass sheets for holding them against said vertical support.

3,913,966

TONGS FOR SUSPENDING GLASS

Peter Henry Richards, Kenilworth, England, assignor to Triplex Safety Glass Company Limited, London, England

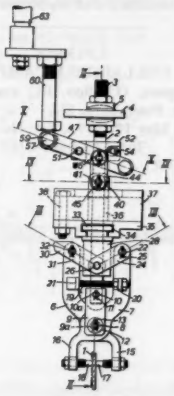
Filed Mar. 12, 1974, Ser. No. 450,369

Claims priority, application United Kingdom, July 20, 1973, 34702/73

Int. Cl.[2] B66C *1/48*

U.S. Cl. 294—118 **31 Claims**

1. Tongs for suspending glass, comprising an elongated suspension member adapted for fixing at its upper end to a tong bar, a pair of tong arms pivoted about a pivot on the suspension member at a fixed distance from its upper end, which tong arms extend beyond the pivot to form jaws of the tongs, tong links pivotally connected to the tong arms and pivotally connected to a weighted slider which, in use of the tongs, is slidable vertically on the suspension member, which



tong links are arranged to close the jaws in the lowermost rest position of said weighted slider under gravity, and lifting means attached to the weighted slider and operable to raise the slider on the suspension member and thereby, through the action of the tong links, open the tong jaws about the pivot on the suspension member.

3,913,967

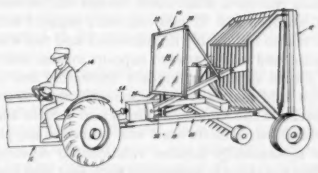
BALER SHIELD

Daniel H. Johnson, Rte. No. 1, Chariton, Iowa 50049, and Harry T. Johnson, Box 83, Williamson, Iowa 50272

Filed Sept. 6, 1974, Ser. No. 504,277

Int. Cl.[2] B60R *21/02*

U.S. Cl. 296—1 R **2 Claims**



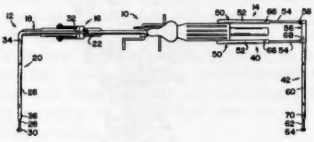
1. The combination of a hay baling unit consisting of a mobile hay baling machine of a type forming cut hay into tied rolls, a tractor with an operator's station and hitched to said baling machine for towing the same and a shielding means operatively secured to said unit intermediate the baling machine and the operator's station to prevent such station from being enveloped by swirling hay and dust generated by the normal operation of the baling machine, said shielding means comprising:

a closed frame of angle material defining a pair of sides at right angles to each other,

a third side secured to said angle material in spaced relationship to one of the sides thereof to form a track whereby said angle material defines generally an F shape, a deflector plate contoured to the shape of said frame and secured thereto by a frictional slip-fit engagement of the plate edge portion into said track,

said frame having a top end and a bottom end,
said baling unit including a tongue structure intermediate said baling machine and said operator's station, and
means securing said frame to said tongue structure in a generally upstanding position so that said bottom end is disposed tranversely of a direction of forward travel on said tongue structure and supported thereon.

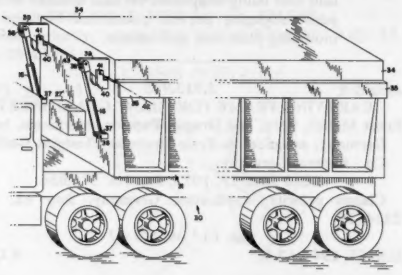
3,913,968
COLLAPSIBLE CAMPER
Patrick M. Luppens, O'Fallon, Ill., assignor to Robert B. Schoolcraft, St. Petersburg, Fla.
Filed May 17, 1974, Ser. No. 470,958
Int. Cl.² B60P 3/32
U.S. Cl. 296—23 R **14 Claims**



1. A collapsible camper configured to support a tent covering on a bicycle frame, said collapsible camper comprising a tent covering and a front and rear assembly, said front assembly including a forward attachment means, forward interconnect means and forward support means, and said rear assembly including a rearward attachment means, rearward interconnect means and rearward support means; said forward attachment means removably coupled to the forward portion of the bicycle frame and extending forward therefrom, said forward interconnect means attached at one end to said forward attachment means and extending forwardly therefrom and to said forward support means at its opposite end to fixedly interconnect said forward attachment means and said forward support means, said forward support means extending laterally outwardly and then downward from said forward interconnect means to engage the ground spaced to one side of said vehicle when operatively assembled; the rearward attachment means is attached to the rear portion of the bicycle frame, said rearward interconnect means attached at one end to said rearward attachment means and extending rearwardly therefrom and to said rearward support means at its opposite end to removably interconnect said rearward attachment means and said rearward support means, said rearward support means extending laterally outwardly and then downward from said rearward interconnect means to engage the group spaced to the same one side of said vehicle when operatively assembled, said forward and rearward support means being in substantially parallel relationship relative to each other when operatively assembled such that said forward and rearward assemblies and the bicycle frame cooperatively support the tent covering to form a collapsible camper.

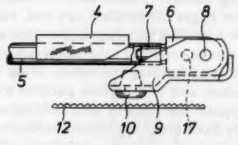
3,913,969
TRUCK BODY CLOSURE
Norris R. Hoch, Largo, Fla., assignor to Jeff-Ko Manufacturing Co., Inc., Milwaukee, Wis.
Filed Mar. 25, 1974, Ser. No. 454,728
Int. Cl.² B60P 7/02
U.S. Cl. 296—100 **6 Claims**

1. In a load carrying wheeled vehicle open top box body having sides and a front and rear and provided with a closure for the open top of the box body, the combination of
a single substantially rigid closure member of substantially rigid material extending entirely over said open top of said box body,
said substantially rigid closure member hingedly attached to said box body near the upper front edge of said box body to hingedly open on an axis, said axis being transverse with respect to the vehicle,
said axis being disposed both forward from said upper front edge and at an elevation higher than said upper front edge,
at least one hydraulic operating member having two ends and comprising a cylinder and a piston,
means for attaching said hydraulic operating member to said substantially rigid closure member outside the interior of said body enclosed by said body and said closure member,



means for attaching said hydraulic operating member to a portion of said box body outside the interior of said body enclosed by said body and said closure member,
the ends of said hydraulic operating member being attached respectively to said means, and
means for supplying hydraulic fluid under pressure to said hydraulic operating member.

3,913,970
CLAMPING DEVICE FOR RIGID AUTOMOBILE SLIDING ROOFS
Hans Jardin; Robert Leiter, and Alfons Lutz, all of Krailling, Germany, assignors to Webasto-Werk W. Baier KG, Stockdorf, Munich, Germany
Filed Apr. 9, 1973, Ser. No. 349,183
Claims priority, application Austria, Apr. 10, 1972, 83067/72
Int. Cl.² B60J 7/04
U.S. Cl. 296—137 F **14 Claims**



1. In an actuating mechanism for rigid automobile sliding roofs, especially for roofs of the type which require the lowering and raising of the rear portion of the sliding roof panel in the opening and closing procedure, where a clamping rod is arranged on each side of the sliding roof panel, the clamping rod being mounted and guided thereon for longitudinal forward and rearward motion relative to the sliding roof panel, and where a linkage and actuating handle cooperate with the two clamping rods so as to effect their forward and rearward motions, and the actuating handle inclues means for locking the linkage in at least one position;
the combination thereof with a clamping device on each clamping rod, each comprising in combination:
a clamping lever pivotally attached by one end to the clamping rod and so oriented that the lever radiant, defined by a line connecting its pivot point with the free end of the

lever, extends from said point of attachement at an angle in relation to the clamping rod axis;

means for biasing the clamping lever so as to urge its free end toward the clamping rod axis;

an abutment member attached to the sliding roof panel in the motion path of the clamping lever, the abutment member being so arranged that a longitudinal displacement of the clamping rod and clamping lever causes the latter to be pivoted away from the clamping rod axis against the biasing means; and

a clamping track on the stationary part of the roof structure facing the path of the free end of the clamping lever in the various positions of the latter in correspondence with different opening positions of the sliding roof panel, the clamping track cooperating with the free end of the clamping lever to produce a clamping effect on the sliding roof panel, when the clamping lever is forced against the abutment member.

3,913,971

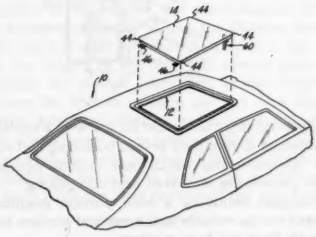
DETACHABLE SUN ROOF PANEL FOR AUTOMOBILES

Hal Green, Southfield, Mich., assignor to Empire Automotive, Inc., Southfield, Mich.

Filed Feb. 21, 1974, Ser. No. 444,274

Int. Cl.² B60J 7/18

U.S. Cl. 296—137 B **7 Claims**



1. A sun roof for a vehicle having a roof with a central aperture formed therein, comprising: a molding formed completely around the perimeter of the aperture and including a resilient element and a rigid section attached to and supported on the roof at the perimeter of the aperture and extending into the aperture and about the perimeter underlying the resilient element to support it against motion in a direction toward the interior of the vehicle; and a detachable panel adapted to be supported on the resilient element to close the aperture and including a handle member pivotably supported with respect to the underside of the panel for motion between an open position in which it allows the panel to be inserted in said aperture onto said molding, and a closed position wherein it contacts a section on the underside of the molding pulling the adjacent under surface of the panel against the resilient element to lock the panel within the aperture and a fastener means affixed to its underside on an edge opposite to the one supporting the handle, so as to project beneath the adjacent edge of the panel, the fastener means and adjacent edge of the panel being adapted to engage a section of the molding so as to press the adjacent section of the panel against the resilient element.

3,913,972

ADJUSTABLE LIFTING MECHANISM FOR AUTOMOBILE SLIDING ROOF

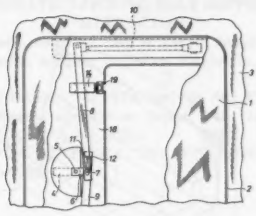
Hans Jardin, Krailling, Germany, assignor to Webasto-Werk W. Baier KG, Stockdorf, Munich, Germany

Filed June 17, 1974, Ser. No. 480,243

Claims priority, application Germany, June 16, 1973, 2330754

Int. Cl.² B60J 7/04

U.S. Cl. 296—137 F **8 Claims**



1. In a mechanism designed for lowering the rear portion of a rigid automobile sliding roof panel, for opening it through retraction under a stationary roof portion, and for correspondingly raising the panel, after it has been advanced toward the closed position, wherein said panel rear portion is supported on both lateral sides by a pivoting lifting linkage attached to the panel, which linkage is adapted for raising and lowering the panel in response to the fore and aft motions of two connecting rods extending horizontally forwardly from the two lifting linkages, a mechanism combination for adjustably holding the sliding roof panel in a self-locking raised, i.e. closed, position comprising in combination:

a pair of transversely extending rocking levers mounted on the sliding roof panel, the levers having outer ends by which they are connected to the connecting rods and inner end portions located near the center of the roof panel;

a first vertical-axis pivot connection between the roof panel and a point on each rocking lever located intermediate its inner and outer ends;

an operating handle located adjacent said inner end portions of the rocking levers, the handle being rotatably connected to the roof panel by means of a second pivot connection;

actuating means defined by said inner end portions and by the operating handle for obtaining a fore and aft pivoting motion of the rocking levers from a rotary motion of the operating handle, thereby raising and lowering the rear portion of the roof panel, said actuating means having a self-locking engagement postion of the dead-center type in at least the handle position which corresponds to the raised roof panel; and

means associated with the rocking levers for adjusting said raised position of the roof panel in relation to said self-locking engagement position of the actuating means; said panel position adjusting means being part of said first vertical-axis pivot connections of the two rocking levers.

3,913,973

COMBINATION POOL TABLE AND COUCH

Gary Mintz, 9239 Monogram Ave., Sepulveda, Calif. 91343; S. Stanley Mintz, 2023 Seebeck Court, San Jose, Calif. 95132, and Robert B. Pierce, 3680 La Calle Court, Palo Alto, Calif. 94306

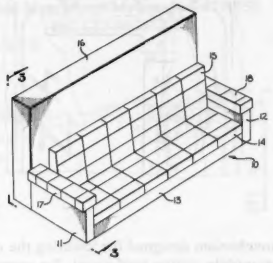
Filed July 15, 1974, Ser. No. 488,500

Int. Cl.² A47C 13/00

U.S. Cl. 297—127 **9 Claims**

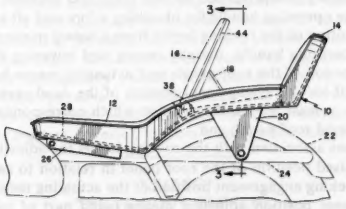
1. A combination pool table and couch comprising:

a. a pair of arm members each having horizontal and vertical supports;
b. a substantially horizontal frame having top and bottom surfaces, said frame being disposed intermediate said arm members;
c. a rectangular table having a pool playing area on one side thereof, the length of said table being commensurate with the interval intermediate said arm members;
d. a pair of placement brackets pivotally coupled to said arm members, said pivotal couplings being intermediate two ends of said brackets, the first end of said placement



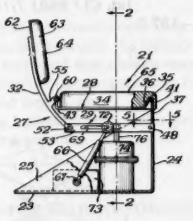
brackets being secured to said table, said table being rotatable between a horizontal and a vertical position;
e. resilient tensile means coupled between the second end of at least one of said placement brackets and said frame, said resilient tensile means being shortest when said table is intermediate its horizontal and vertical positions whereby said resilient tensile means counterbalances said table; and
f. leveling means for leveling the pool playing area, said leveling means being coupled to the bottom surface of said frame.

3,913,974
CYCLE SEAT
Kenneth L. Bowen, 4030 Aragon Drive, San Diego, Calif. 92115
Filed Sept. 16, 1974, Ser. No. 506,344
Int. Cl.² B62J 1/00
U.S. Cl. 297—195 **2 Claims**



1. A cycle seat for motorcycles and the like, comprising:
an elongated seat frame having a front flat portion forming a front seat portion for supporting a front rider, and a rear raised portion for supporting a rear passenger,
said rear seat portion being raised to fit over the rear fender of the cycle and having an upwardly extending fixed rear end portion forming a backrest for the rear seat passenger,
means for securing said frame to the cycle,
a cushioned cover secured on said frame,
said rear seat portion having fixed side cushions with a recessed opening therebetween,
said rear seat portion having a pivoted center part in said opening with a frame and a corresponding part of the cushioned cover, said center part being pivoted at its forward end to the seat frame to swing upwardly and forwardly to an upright position to form a front backrest for the front seat portion spaced forward of the fixed backrest, and forming a pair of the rear seat portion in a down position in said opening,
and support means for supporting said front backrest in the upright position.

3,913,975
SUSPENSION SEAT
John W. Carter, Davenport, Iowa, assignor to Seats, Incorporated, Reedsburg, Wis.
Continuation-in-part of Ser. No. 220,803, Jan. 26, 1972, which is a continuation-in-part of Ser. No. 47,762, June 19, 1970. This application July 23, 1973, Ser. No. 381,922The portion of the term of this patent subsequent to Jan. 16, 1990, has been disclaimed.
Int. Cl.² B60N 1/00
U.S. Cl. 297—307 **17 Claims**



1. An improved suspension seat for use with a vehicle which may be subjected to relatively severe bouncing and vibrations during its operation and which may include operator-controlled foot pedals, the improved seat comprising:
a seat support including a base portion adapted to be mounted on the vehicle and a vertical portion extending upwardly from the base portion;
a parallelogram linkage including: first and second, substantially identical, links spaced horizontally from each other, with each of the first and second links having a front end and a rear end and having their front ends pivotally connected to the vertical portion of the seat support at points spaced from each other and spaced equidistant from the base portion of the seat support; a bottom cushion pan having a front end, a rear end and side edges, with the bottom cushion pan being spaced from and vertically above the first and second links so that the front end of the bottom cushion pan generally overlies the front ends of the first and second links; a third and fourth, substantially identical, links, with each of the third and fourth links having a first end and a second end, with the first end of the third link being pivotally connected with the rear end of the first link and the first end of the fourth link being pivotally connected to the rear end of the second link, and with the third link being pivotally connected, at a point intermediate its ends, to the rear end of the bottom cushion pan, and adjacent to one side thereof, and the fourth link being pivotally connected at a point, intermediate its ends, to the rear end of the bottom cushion pan, and adjacent to the other side thereof;
a back cushion pan connected with and carried by and between the second ends of the third and fourth links;
a bottom cushion supported and carried by the bottom cushion pan, the bottom cushion having an inner surface which is disposed adjacent to the bottom cushion pan and

an outer body contacting surface which is generally parallel to the inner surface but spaced therefrom, which is adapted to come in contact with the body of a person when the person is seated on the seat and which has a front edge adjacent to the front end of the bottom cushion pan;

a back cushion supported and carried by the back cushion pan, the back cushion having an inner surface which is disposed adjacent to the back cushion pan and an outer body contacting surface which is generally parallel to the inner surface but spaced therefrom and which is adapted to come into contact with the body of the person when the person is seated on the seat;

the parallelogram linkage, the back cushion and the bottom cushion being arranged so that the pivotal connections between the rear end of the bottom cushion pan and the third and fourth links are disposed adjacent to the intersection of the plane of the outer body contacting surface of the bottom cushion and the plane of the outer body contacting surface of the back cushion whereby the back cushion tends to pivot, with respect to the bottom cushion, about the hip joint of the person seated on the seat; the parallelogram linkage also being arranged, with respect to the vertical portion of seat support, so that the parallelogram linkage, and thus the bottom and back cushions pivot, with respect to the vertical, about the front edge of the upper body contacting surface of the bottom cushion whereby the front edge of the upper body contacting surface of the bottom cushion remains relatively stationary, with respect to the rest of the seat and with respect to the vertical, during operation of the vehicle so as to minimize the tendency of the person's feet from being lifted off the foot pedals of the vehicle during operation of the vehicle, the parallelogram linkage further being constructed so that the distance between the front and rear ends of the bottom cushion pan is greater than the length of the first and second links so as to minimize the change (decrease) in the included angle between the bottom cushion and the back cushion and thereby reduce pinching of the person during downward, vertical movement of the seat; and biasing means, extending between the base portion of the seat support and the parallelogram linkage, for biasing the parallelogram linkage away from the base portion of the seat support.

3,913,976

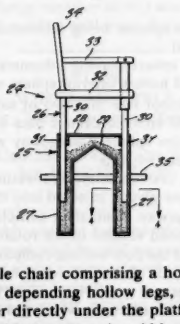
VERTICALLY ADJUSTABLE CHAIR

Luisa Plancher, and George Spector, both of 3615 Woolworth Bldg., 233 Broadway, New York, N.Y. 10007

Filed Feb. 5, 1974, Ser. No. 439,927

Int. Cl.² A47C *3/20*

U.S. Cl. 297—345 **2 Claims**



1. An adjustable chair comprising a hollow base having a top platform and depending hollow legs, said base including an upper chamber directly under the platform, said chamber interconnecting with the spaces in said legs, including sand in said chamber and legs, including openings through said platform in vertical alignment with the spaces in said legs, in combination with a frame mounted on said base, said frame comprising a seat parallel to and spaced from said platform, including frame legs depending from said seat and slidably mounted snugly in said openings and extending telescopically into said hollow legs, said frame legs being in guiding engagement with the hollow legs, said frame further including a back rest secured to said seat and an arm rest disposed parallel to and spaced from said seat.

3,913,977

AUTOMATIC LOCKING BELT SUPPORTED RETRACTOR

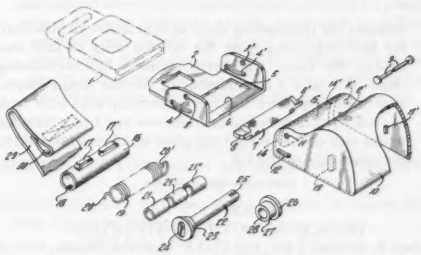
Takezo Takada, deceased, late of Tokyo, Japan (by Juichiro Takada, heir), assignor to Takata Kojyo Co., Ltd., Tokyo, Japan

Filed Feb. 14, 1974, Ser. No. 442,974

Claims priority, application Japan, Feb. 16, 1973, 48-18300; Mar. 6, 1973, 48-25702

Int. Cl.² B60R *21/10*; **A47D** *15/00*

U.S. Cl. 297—388 **11 Claims**



1. A retractable safety belt device comprising a bracket, a transversely extending reel mounted at a rear portion of said bracket and spring biased in a belt retracting direction, a transversely extending guide bar mounted at a forward portion of said bracket and fixed against longitudinal movement therein, a forwardly projecting coupling member mounted on the forward portion of said bracket and movable relative thereto between advanced and retracted positions, said coupling member including a cross web at its rear portion having a transverse guide slot therein whose rear edge is defined by a transverse lock bar parallel to said guide bar and movable toward and away from said guide bar with the advance and retraction of said coupling member respectively and a belt connected to and windable by said reel and extending forwardly therefrom upwardly through said guide slot and between said bars, about said guide bar and downwardly through said guide slot and rearwardly toward a vehicle anchor point.

3,913,978

SEAT CONSTRUCTION

Fritz O. Lester, Kalamazoo, Mich., assignor to Liane E. Lester, Kalamazoo, Mich.

Filed Nov. 28, 1973, Ser. No. 419,685

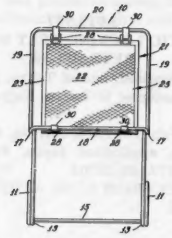
Int. Cl.² A47C *7/14*, *7/28*

U.S. Cl. 297—445 **9 Claims**

1. A chair comprising in combination:
1. a floor or ground-engaging support,
2. an external seat and back supporting frame affixed to said floor or ground-engaging support having an upper and lower transverse frame member, parallel to each other and to the floor,
3. an integral substantially rigid sheet-form seat and back member being substantially L-shaped in vertical longitudinal section disposed internally with respect to said supporting frame, with the top edge parallel to and spaced from the upper transverse member and with the

bottom edge parallel to and spaced from the lower transverse member, and

4. means attaching said seat and back member and supporting same solely at the ends thereof to the upper and lower transverse members of said supporting frame, said means consisting of at least two non-flexible tabs projecting from the top edge of said seat toward the upper transverse



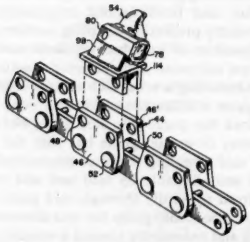
member but terminating short of it, at least two non-flexible tabs projecting from the bottom edge of said seat toward the lower transverse member but terminating short of it, and a like number of flexible straps looped over their respective transverse member with both ends of each strap fastened to one tab, one end being fastened to one side of the tab and the other end being fastened to the other side of the tab.

3,913,979

TRENCHER TOOTH CONSTRUCTION

Robert F. Strauss, Cary, and Carl F. Lawrenz, Skokie, both of Ill., assignors to Service Dynamics, Inc., Lake Bluff, Ill.

Filed June 25, 1973, Ser. No. 373,430
Int. Cl.² E02F 9/28
U.S. Cl. 299—84 **16 Claims**



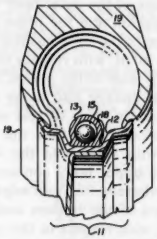
1. A trenching apparatus comprising an orbital endless chain, a plurality of trencher tooth assemblies mounted to the chain at spaced intervals therealong for movement therewith, adjacent teeth being orientated at different angles relative to the direction of travel of said chain, each tooth assembly comprising, a tooth member having a depending shank, a multi-faceted tooth holder, slot means formed in the tooth holder and opening to one facet thereof for receiving said depending shank, a Pi shaped carrier, said tooth holder having multiple other angularly related facets, each of said other angularly related facets being selectively positionable on the carrier for permanent attachment thereto, the selection of said other facet fixing the angular disposition of the tooth holder on the carrier and determining the angle of orientation of the tooth relative to the direction of the travel of the chain, the selected said other facet being permanently secured to the carrier, means securing said shank within said slot means and means removably coupling said carrier to said chain, said tooth holder having a leading face and a ring-like formation formed on said face about the periphery thereof and defining, with said face, a cup-like configuration.

3,913,980

DYNAMIC WHEEL AND TIRE BALANCING APPARATUS

Albert H. Cobb, Jr., 5515 Slattery Drive, San Antonio, Tex. 78240

Filed Sept. 9, 1974, Ser. No. 504,142
Int. Cl.² B60B 1/00
U.S. Cl. 301—5 BA **34 Claims**



1. An improved vehicle wheel and tire dynamic weight redistribution and balancing apparatus designed for user installation within the center space between parallel bead mounting flanges of a wheel rim for a tubeless pneumatic tire, said improved tire and wheel balancing apparatus comprising:

A. A semi-rigid elastic annular rim encircling balancing tube to surround and be attached to the outer rim surface of a conventional vehicle wheel in a position concentric with the hub of the wheel and positioned in a selected vertical plane dividing the mass of the complete wheel, rim and tire assembly into equal left and right masses, said annular rim encircling balancing tube having

1. a hollow circular cross-section passageway cavity forming a channel disposed through the length of said elastic annular rim encircling balancing tube suitable for free movement of a rollable sphere therein,
2. said rim encircling balancing tube being fabricated from an electrically non-conductive plastic material; and

B. a plurality of rollable weight redistribution and balancing spheres with

1. each of said spheres being fabricated from a selected material, and
2. each of said spheres having a diameter smaller than the width of said hollow interior sphere passageway cavity and of sufficient size that two of said rollable weight redistribution spheres cannot pass each other in said hollow interior sphere passageway where the spheres are to be inserted; and

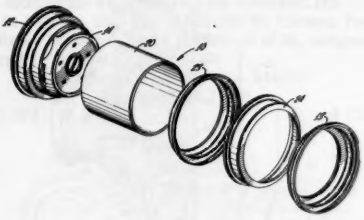
C. a quantity of low viscosity, non-wetting damping fluid, such as ethylene glycol, injected into the interior of said tubular passageway channel in sufficient quantity such that the combined volume of the rollable weight balancing spheres and the non-wetting damping fluid fill approximately two-thirds of the interior volume of said tubular passageway channel to provide a slightly damped mobility enhancing fluid medium in which the balancing spheres can move freely without sticking to each other or sticking to the interior wall of said tubular sphere passageway cavity.

3,913,981

DUAL TIRE WHEEL AND METHOD OF MAKING SAME

Bob L. Hunden, Anaheim, Calif., assignor to Dennis A. Solis, Garden Grove, Calif.

Filed June 6, 1974, Ser. No. 476,907
Int. Cl.² B60B *11/00*
U.S. Cl. 301—36 R 2 Claims



1. A dual tire wheel resulting from a method comprising the steps of:

starting with a conventional pneumatic tire wheel, of the type including a hollow, cylindrical thin wall portion, inner and outer radially outwardly extending tire retaining flanges made integral with the inner and outer edges, respectively, of said cylindrical portion, and a hub connected to the inner surface of said cylindrical portion for connection to the flange of a conventional drive axle;

cutting said cylindrical portion so as to separate said outer flange from said cylindrical portion, said inner flange, and said hub;

positioning a hollow, cylindrical, thin wall drum having inside and outside diameters equal to the inside and outside diameters, respectively, of said cylindrical portion of said wheel with one end thereof abutting against the cut end of said cylindrical portion of said wheel and welding said one end of said drum to said cylindrical portion of said wheel;

positioning a first annular, ring-shaped, tire retaining flange member, having the same general configuration as said outer flange, around said drum in the same position relative to said inner flange as said outer flange previously occupied and welding said first flange member to said drum;

positioning a second annular, ring-shaped, tire retaining flange member having the same general configuration as said inner flange, around said drum in parallel spaced relationship relative to said first flange member and welding said second flange member to said drum; and

positioning said cut-off outer flange abutting against the other end of said drum in the same position relative to said second flange member as said inner flange previously occupied and welding said outer flange to said drum.

3,913,982

WHEEL ASSEMBLY

Gilbert G. Brewer, 10108 Fairmont Road, Newbury, Ohio 44065

Filed Oct. 23, 1974, Ser. No. 517,369
Int. Cl.² B60B *15/00*
U.S. Cl. 301—45 10 Claims

1. A wheel assembly comprising,

a support assembly adapted for mounting on a vehicle axle,

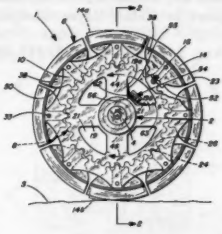
tread means supported by said support assembly for riding movement along a support surface,

said support assembly includes,

a drive wheel section for rotation with the vehicle axle about its rotational axis,

a support wheel section mounted for rotational movement about the rotational axis of said vehicle axle and relative to said drive wheel section for angular displacement therebetween,

said tread means includes a plurality of tread segments which together define a generally circular peripheral configuration for said wheel in the non-displaced position of said drive wheel section, and



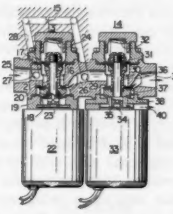
said support assembly includes expansion means for displacing said tread segments radially outwardly to define a generally non-circular peripheral configuration for said wheel upon displacement of said drivewheel section relative to said support wheel section for increasing the traction of said wheel assembly with the support surface.

3,913,983

MODULATOR FOR USE IN AIR BRAKE SYSTEM WITH ANTI-SKID DEVICE

Yukichi Sekiguchi, Saitama, Japan, assignor to Sanwa Seiki Mfg. Co. Ltd., Yono, Japan

Filed Jan. 13, 1974, Ser. No. 540,465
Int. Cl.² B60T *8/00*
U.S. Cl. 303—21 F 1 Claim



1. A modulator for use with an air brake system with an anti-skid device comprising

a. a solenoid controlled two port connection valve (13) in which a valve rod (16) which is carried by an upper diaphragm (17) and a lower diaphragm (18) vertically spaced apart from each other by a predetermined distance, provided with a valve member (19) interposed between said upper and lower diaphragms, and is biased in the axial direction thereof under the force of a bias spring (24), is made into engagement with a plunger coaxially thereof of a solenoid coil (22);

b. a bypass passage (28) with a restrictor (15) for bypassing said two port connection valve by intercommunicating between an intake port (25) and an outlet port or passage (26) of said two port connection valve; and

c. a solenoid controlled three port connection valve (14) in which a valve rod (30) with a valve (35) interposed between an upper valve seat (37) and a lower valve seat (38) is carried by a diaphragm (31) and is biased in the axial direction thereof under the force of a spring (32) so as to be made into engagement with a plunger of a solenoid coil (33), whereby when said valve (35) is displaced,

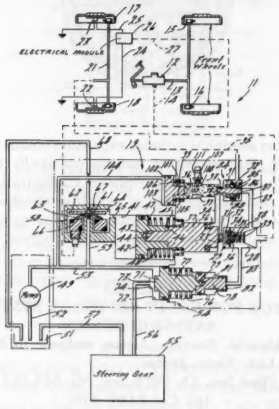
the communication among an outlet port (39), said passage (26), and a discharge port (40) may be established or interrupted.

3,913,984

SKID CONTROL SYSTEM EMBODYING AUTOMATIC CYCLING AND FAIL SAFE DEVICE

Peter Every, Livonia, and Leonard T. Tribe, Ann Arbor, both of Mich., assignors to Kelsey-Hayes Company, Romulus, Mich.

Filed Aug. 24, 1973, Ser. No. 391,490
Int. Cl.² B60T 8/02
U.S. Cl. 303—21 F **11 Claims**



1. A skid control system for a self-propelled vehicle having at least one hydraulically operated wheel brake comprising a brake actuating device including a hydraulic circuit for selectively actuating the one wheel brake, skid control means including a valve for controlling the flow through said hydraulic circuit for modifying the actuation of the one wheel brake in response to a predetermined signal to prevent a skid condition, said valve being movable between an opened position and a closed position, a member movable between a normal braking position and a skid control position, said member being operatively connected with said valve and being effective when in its normal braking position for holding said valve in its opened position, said valve being movable to its closed position when said member moves from its normal braking position toward its skid control position but before said member reaches its skid control position, and means for moving said member between said positions in response to the stopping and restarting of the vehicle engine for automatically cycling said member.

3,913,985

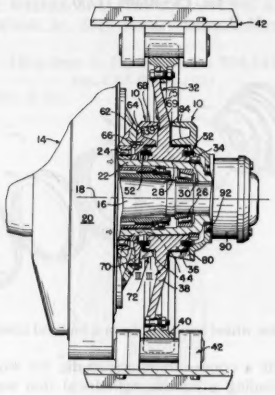
SEAL PROTECTION GUARD

Robert S. Orr, Pekin, and Carl E. Fidler, Chillicothe, both of Ill., assignors to Caterpillar Tractor Company, Peoria, Ill.

Filed Mar. 28, 1973, Ser. No. 345,567
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B62D 55/00
U.S. Cl. 305—11 **9 Claims**

1. A seal protection guard, for an annular seal assembly disposed between a pair of relatively rotatable members to minimize the entry of extraneous material into the seal assembly, comprising;

barrier means disposed in closely radially spaced relation to such a seal assembly and having a plurality of circumferentially spaced shielded openings formed therein to minimize tightly constrained packing of such material outwardly adjacent to the seal assembly by permitting the material to be squeezed substantially directly radially



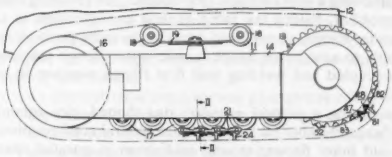
outwardly through the circumferentially spaced openings upon the imposition of an externally applied force tending to press such material into the seal assembly.

3,913,986

ENDLESS TRACK FOR VEHICLE

Donald L. Schaffner, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Division of Ser. No. 311,338, Dec. 1, 1972. This application Jan. 2, 1974, Ser. No. 429,990
Int. Cl.² B62D 55/20
U.S. Cl. 305—57 **5 Claims**



1. A section of an endless track for a crawler tractor comprising:

a pair of transversely spaced parallel links adapted at longitudinally opposite ends thereof for pivotal connection on parallel axes to complementary links,

a shoe structure extending transversely between and having its opposite transverse ends disposed below and releasably secured to said links, respectively, said shoe structure having a top side and a bottom side and including

a ground engaging part on the bottom side of said shoe structure,

means for releasably securing said shoe structure to said pair of links,

a component releasably secured to the top side of said shoe structure and having an upper side,

means for releasably securing said component to said shoe structure,

a pair of longitudinally spaced sprocket engaging drive lugs of the central portion of the upper side of said component,

a pair of longitudinally extending guide rails on the upper side of said component and adjacent transversely opposite sides of said drive lugs,

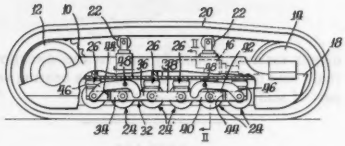
and a pair of flat roller engaging surfaces, each roller engaging surface located between one of said guide rails and one of said links,

said roller engaging surfaces being disposed above but in closed proximity to a plane defined by said axes.

3,913,987
TRACK TYPE TRACTORS HAVING RESILIENTLY MOUNTED TRACK ROLLER ASSEMBLIES

Arden E. Baldwin, East Peoria; Harold W. Carlson, Peoria, and Bruce W. Miers, Peoria Heights, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 21, 1974, Ser. No. 444,315
Int. Cl.[2] B62M 27/00
U.S. Cl. 305—27 **9 Claims**



1. A truck for a track type tractor comprising:

an elongated truck frame;

a pair of track sprockets, one journalled on said frame at each end thereof;

an endless track trained about said sprockets and said truck frame;

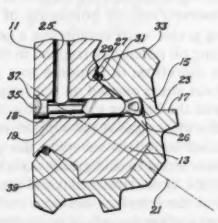
a plurality of track roller assemblies engaging the upper surface of the lower run of said track at longitudinally spaced points between said sprockets;

a plurality of resilient means, one for each track roller assembly, interconnecting the associated track roller assembly and said frame for cushioning, in a vertical direction, movement of said track roller assemblies; and non-resilient means interconnecting said track roller assemblies and said frame for firmly restraining said track roller assemblies against longitudinal movement relative to said frame while allowing movement of said track roller assemblies relative to said frame in a vertical direction, said restraining means being elongated in the direction of elongation of said frame.

3,913,988
JOURNAL BEARING AND METHOD UTILIZING HIGH CARBON SURFACE

Stanley R. Scales, and Richard B. Prince, both of Houston, Tex., assignors to Hughes Tool Company, Houston, Tex.

Division of Ser. No. 261,754, June 12, 1974. This application Nov. 25, 1974, Ser. No. 527,110
Int. Cl.[2] F16C 19/00
U.S. Cl. 308—8.2 **12 Claims**



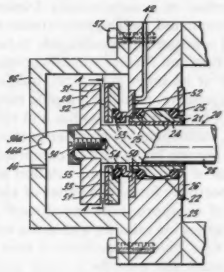
1. In an earth boring drill bit having at least one sealed and lubricated bearing surface that engages a mating surface in a rotatable cutter, the improvement which comprises:

a carburized and hardened steel journal having free carbides at the surface thereof; and a cutter having a friction bearing surface rotatably secured to said journal.

3,913,989
AIR BEARINGS

Raymond Williams, Appleton, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Jan. 22, 1973, Ser. No. 325,255
Claims priority, application United Kingdom, Feb. 11, 1972, 6449/72; Aug. 31, 1972, 40515/72
Int. Cl. F16c 17/16
U.S. Cl. 308—9 **8 Claims**

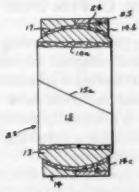


1. A gas lubricated bearing assembly having a sleeve and a shaft the one rotatable relative to the other and having complementary surfaces capable of sustaining self-acting gas lubrication therebetween upon roatation, said sleeve and shaft being longitudinally located with respect to one another firstly by a hydrostatic gas end thrust bearing formed by a cushino of gas maintained in a trapped volume at an cushion of the shaft and secondly by an oppositely acting grooved hydrodynamic thrust gas bearing defined between a radially extending face on the shaft and a co-operating radially extending face associated with the sleeve, means for supplying pressurised gas to the inner end of the co-operating radially extending faces of the hydrodynamic thrust gas bearing, the gas supplied passing radially outwards between the faces of the hydrodynamic thrust gas bearing to feed into the trapped volume and a restricted outlet orifice being provided for venting of gas from the trapped volume.

3,913,990
POLYTETRAFLUOROETHYLENE-LINED BEARING IMPROVEMENT

Phillip R. Eklund, Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 276,338, July 31, 1972, Pat. No. 3,769,672. This application June 29, 1973, Ser. No. 375,240
Int. Cl. F16c 9/06
U.S. Cl. 308—72 **3 Claims**



1. A spherical bearing assembly comprising; an outer race member having a spherical cavity; a ball bearing member

disposed within the spherical cavity of said outer race member; and a combined metal/Teflon laminated liner member positioned in intermediate relation between and in respective direct and indirect contact with the spherical cavity of said outer race member and the surface of said ball bearing member; said combined metal/Teflon laminated liner member comprising: a first, outer, metal backing member portion closely interfitted in, and having its outer surface adhesively bonded to the outer race memberspherical cavity to thereby provide a positive hold between said liner member and said outer race member throughout the entire surface of the spherical cavity of said outer race member and thus eliminate any normal tendency thereof to crimp at the outer edges during the fabrication of the bearing assembly; a second, inner, skiving member portion of a substantially frictionless material such as Teflon laminated under predetermined conditions of temperature and pressure on its outer side to said metal backing member portion and further slidably contacting said ball bearing member at its inner side; first, built-in, mechanical interlocking and positive, non-slip gripping means comprising a series of grooves incorporated within and on the inner surface of said first, metal backing member portion; said second, skiving member portion being further comprised of a sintered metal-filled material in a composite relation with the Teflon thereof and respectively forming a series of metai filler particles composed of an appropriate metal such as bronze and disposed in interengaging relation within the series of grooves comprising said first, built-in, mechanical interlocking means to thereby automatically provide a more positive hold between, and thus significantly reinforcing the inherent laminated bond of the said backing and skiving member portions to each other; second, mechanical interlocking means integrally formed in opposed relation to said metal/Teflon liner member portion and comprising an outwardly curved lip portion on the outer side of, and as integral extensions on each of the opposite ends of said metal/Teflon liner member for fixed, overlapping attachment with the outer race member, and thereby providing additional reinforcement to the said adhesive bond initially formed between said outer race and metal/Teflon liner members; and third, mechanical interlocking means comprising a series of slits formed in oppositely-disposed relation to, and extending adjacent to the inner surface of the spherical cavity of said outer race member to thereby provide for the swaging, dimpling or staking thereto of appropriate, local portions of the material of said metal/Teflon liner member and thus assure even more reinforcement to the adhesive bond between said liner and outer race members.

3,913,991

LOWER BEARING FOR ROTORS WHICH REVOLVE AT HIGH SPEEDS AND HAVE AN ESSENTIALLY VERTICAL AXIS OF ROTATION

Wolfgang Hepp, Immenstaad; Klaus Pimiskern, Friedrichshafen, and Werner Herbert, Markdorf, all of Germany, assignors to Dornier System GmbH, Germany

Filed June 25, 1973, Ser. No. 373,158

Claims priority, application Germany, Aug. 16, 1972, 2240126

Int. Cl. F16c *27/00*

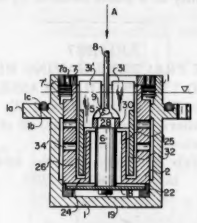
U.S. Cl. 308—144 **9 Claims**

1. In a lower bearing for a rotor having a substantially vertical axis of rotation and adapted to rotate at high speeds, particularly with a shaft having a spherical shaft end provided with spiral grooves and received in a stationary ball cup, wherein said ball cup is elastically connected with a bearing housing by means producing a restoring force,

the improvement comprising

a stationary, axially symmetrical first damper means positioned in the lower portion of said bearing housing concentrically with respect to said shaft and at least enclosing a carrier of said ball cup, said damper means forming with said bearing housing an upwardly open ring slot, and

a second damper means secured to a stationary bearing part and projecting into said ring slot, and carrying baffle



means extending radially and in the direction of said shaft, said baffle means enclosing the bearing and at least part of said shaft.

3,913,992

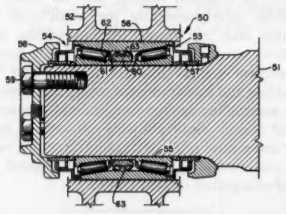
EXTENDED BEARING LUBRICATION METHOD AND APPARATUS

William P. Scott, and Charles J. Swartz, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Apr. 26, 1972, Ser. No. 247,578

Int. Cl. F16c *1/24*

U.S. Cl. 308—187 **13 Claims**



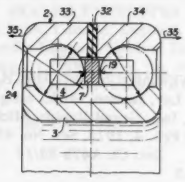
1. In a bearing assembly having a stationary element and a rotary element and including bearing surfaces therebetween, an improved extended life lubricating apparatus for supplying oil to the bearing surfaces

comprising: a solid support surface on the rotary element which faces the axis of rotation and is spaced a radial distance from it less than or equal to the radial distance of said bearing surfaces from the axis of rotation, lubricating oil reservoir means consisting of a self-supporting lubricating grease mass comprising a gelled structure and a lubricating oil releasably trapped in the gelled structure releasable therefrom in response to a predetermined oil release shear stress carried on the support surface out of contact with the bearing surface subject to the centrifugal force of the mass against the support surface of a magnitude at least sufficient to apply the predetermined oil release shear stress to said grease mass but of a magnitude less than the predetermined yield stress of said gelled structure at the interface between said grease mass and the support surface for releasing oil therefrom at the base of the mass onto the support surface, and oil flow path means from said support surface to said bearing surface for conducting the released oil propelled by centrifugal force to the bearing surface.

3,913,993
ANTIFRICTION BEARINGS

Horst M. Ernst, Eltingshausen, Germany, assignor to SKF Industrial Trading and Development Company B.V., Amsterdam, Netherlands

Filed Nov. 21, 1973, Ser. No. 418,077
Claims priority, application Germany, Nov. 25, 1972, 2257861
Int. Cl.² F16D 15/00
U.S. Cl. 308—196 9 Claims

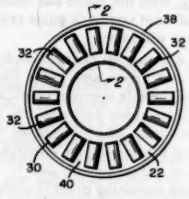


1. A bearing comprising inner and outer race rings, a plurality of antrifriction bearing elements positioned therebetween and arranged in two annular rows axially spaced from each other, a cage arranged between said rows provided with means for holding the bearing elements in at least one row and having clamping surfaces thereon adapted to engage said bearing elements for selective clamping of said elements between same and said inner and outer race rings, resilient means being provided in association with at least one of said cage and inner and outer race rings for resiliently biasing said bearing elements against said clamping surfaces to thereby stop rotation of said bearing elements in a selected direction.

3,913,994
BEARING OFFSET LIP CAGE

Richard Ailing, and John R. Hull, both of Litchfield, Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Aug. 20, 1973, Ser. No. 389,810
Int. Cl.² F16C 33/38
U.S. Cl. 308—235 15 Claims

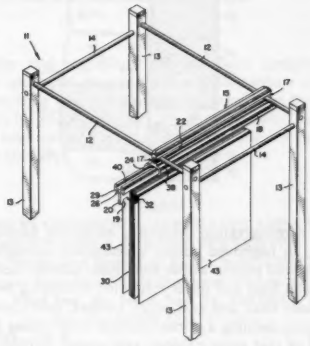


1. A bearing retainer comprising: two ring-shaped retainer members with axially spaced radially extending inside faces having opposed circumferentially spaced radial slots; said retainer members being interfitted at at least one of their peripheries with the first retainer member having a lip extending axially in the direction of the second retainer member, the length of said lip being sufficiently less than the total length of the assembled retainer, so that retention means on an enclosing bearing race does not extend beyond the plane of the opposing raceway.

3,913,995
SUPPORT DEVICE FOR RECORD ELEMENTS

Frank John Malcik, Berwyn; Edward William Whittemore, and John Patrick Clark, both of Elmhurst, all of Ill., assignors to Swingline Inc.

Continuation of Ser. No. 141,183, May 7, 1971. This application Aug. 14, 1972, Ser. No. 280,116
Int. Cl.² A47B 63/00; B42F 15/00
U.S. Cl. 312—183 2 Claims



1. A device for removably supporting bound record elements on a pair of spaced apart parallel rod elements of a filing structure which rod elements are positioned in a substantially horizontal plane comprising:

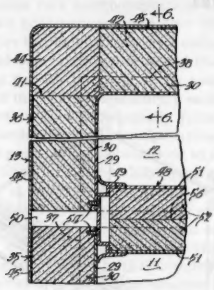
a. a first elongated support member adapted to be mounted on the elements with one end supported by one rod element and the other end supported by another rod element, said first support member including a recess in each end, each recess extending longitudinally inward of said member parallel to the longitudinal axis of said member to a point such that the distance separating the innermost end surfaces of said recesses is approximately equal to the distance separating said rod elements and said first support member is capable of being mounted on said rod elements by positioning the member substantially in the plane of the rod elements at an angle relative to said rods with the recesses adjacent the rod elements and by turning the member in said plane to a position in said plane perpendicular to said rod elements and which first support member includes an elongated open-ended channel positioned below the rod elements; and

b. a second elongated support member supporting the bound record elements and removably supported by said first support member, said second support member capable of being slidably placed in and removed from the elongated channel of the first support member while the first member is supported by the spaced apart parallel rod elements, said second elongated support element includes a recess in each end, each of said last mentioned recesses extending generally longitudinally inwardly toward the second support member, said last mentioned recesses being adapted to receive the rod elements whereby said second support element can be mounted on the rod elements in a direction extending perpendicularly thereto independently of said first support member.

3,913,996
REFRIGERATION APPARATUS ENCLOSURE STRUCTURE

Arthur E. Benford, Evansville, Ind., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Jan. 14, 1974, Ser. No. 433,071
Int. Cl.[2] F25D *23/06*; B65D *25/14*
U.S. Cl. 312—214 **15 Claims**

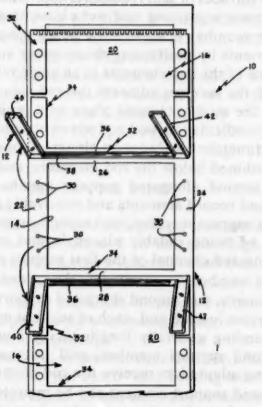


1. In a refrigeration apparatus enclosure having an outer cabinet, an improved corner construction comprising: inner laminate wall means within said outer cabinet defined by an inner sheet liner and outer insulation extending between said inner sheet liner and said outer cabinet, said inner laminate wall means defining a corner portion conforming to a corner contour of said outer cabinet, said corner portion defining a continuous liner corner portion and a void outwardly of said corner liner portion; and foamed-in-place insulation means filling said void and bonded to all surfaces confronting said void including those of said outer cabinet, said liner, corner portion, and said outer insulation.

3,913,997
CABINET CLOSURE SYSTEM

Heino L. Pull, St. Louis County, and Paul F. Rezabek, Jr., Hazelwood, both of Mo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 9, 1974, Ser. No. 486,801
Int. Cl.[2] A47C *77/08*; A47B *81/00*; H05K *09/00*
U.S. Cl. 312—223 **9 Claims**

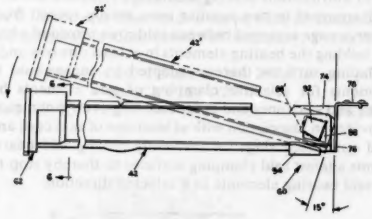


1. In a cabinet having at least one compartment surrounded by four sides, the improvement therein being a cabinet closure system, said closure system comprising at least one closure element, said closure element being of a U-shaped design having a bottom segment and a pair of arms, each of said arms being of a channel-shaped configuration and said bottom segment being pivotally secured to one of said sides and having pressure rims thereon capable of securely wedging a piece of equipment between said sides of said cabinet and said pressure rims and means attached to said closure element for fixedly securing said closure element to said cabinet.

3,913,998
DRAWER MOUNTING MECHANISM

Robert J. Vander Ley, Jenison, Mich., assignor to Leslie Metal Arts Company, Inc., Grand Rapids, Mich.

Filed Feb. 4, 1974, Ser. No. 439,420
Int. Cl. A47b *88/14*
U.S. Cl. 312—343 **12 Claims**



1. In a drawer mounting mechanism for a cabinet having a front panel and a back, with a drawer opening in the front panel and a drawer slidably mounted in the drawer opening, said drawer mounting mechanism comprising a roller mounted on the back of the drawer and riding in a horizontally disposed guide rail that extends from the front to the back of the drawer opening, with the guide rail being mounted to the cabinet by means of front and back guide rail mounting brackets, an improvement wherein:

the guide rail is a C-shaped channel member comprising a side member and upper and lower flanges that extend outwardly from the side member on each side of the roller so that the roller rides between the upper and lower flanges on the inside of the channel member, the side member having a non-circular opening therein adjacent the front end of the guide rail; and

the front guide rail mounting bracket comprises a mounting plate mounted on the front panel of the cabinet at the edge of the drawer opening and a vertical plate extending from the mounting plate inwardly into the drawer opening parallel to the guide rail side member, said vertical plate abutting the outside surface of the guide rail side member and comprising non-circular tab means thereon for releasably locking the guide rail on the mounting bracket, said tab means including a short leg that extends from the vertical plate through the opening in the guide rail to an outer end on the inside of the guide rail, said tab means further including a non-circular locking member formed on the outer end of the leg, said locking member being shaped so as to fit through the non-circular opening

in the guide rail when the guide rail is pivoted to a predetermined skewed angle with respect to the front guide rail mounting bracket, said locking member engaging the inside surface of the guide rail side member and locking the front of the guide rail to the vertical plate of the mounting bracket when the guide rail is pivoted back to its normal position with regard to the mounting bracket.

3,913,999

MANUFACTURING ELECTRIC DEVICES HAVING SEALED ENVELOPES

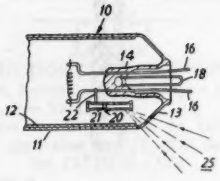
Maurice George Clarke, London, England, assignor to Thorn Electrical Industries Limited, London, England

Filed Aug. 13, 1973, Ser. No. 387,594

Claims priority, application United Kingdom, Aug. 11, 1972, 37648/72

Int. Cl.² H01J *9/395*

U.S. Cl. 316—4 **7 Claims**



1. In a method of manufacturing an electric device having a sealed envelope containing a dosing of at least one constituent in the vapour phase, the steps of:

sealing dosing substance inside a capsule formed of a material selected from the group consisting of aluminium, iron and steel,

placing the sealed capsule inside an envelope and thereafter sealing said envelope, and

directing a focussed beam of radiation from a laser outside said envelope onto the surface of said capsule, whereby the heat generated by said focussed beam causes said capsule to perforate and release said dosing substance.

3,914,000

METHOD OF MAKING TUBELESS GAS PANEL

Martin Beckerman, Woodstock; John A. Murphy, Kingston; John V. Orlandi, Pine Plains, and George W. Smith, Woodstock, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 16, 1973, Ser. No. 351,672

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

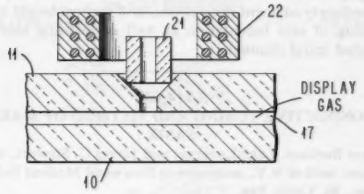
Int. Cl.² H01J *9/38*

U.S. Cl. 316—20 **4 Claims**

1. In the method of making a gas display panel having a front panel and a back panel joined in a spaced sealed arrangement forming an inner chamber containing display gas, wherein the method comprises baking out a partially completed panel assembly and backfilling such assembly with display gas, said backfilling being done by creating an atmosphere of display gas around said panel assembly, the improvement comprising the steps of:

providing said back panel with a passageway communicating between said inner chamber and the exterior of said back panel;

detachably supporting a preform on said back panel in said passageway, said preform being shaped to allow gas to flow through said passageway;



and, after said backfilling step has been completed and while said panel assembly is in said atmosphere of display gas, melting said preform and allowing it to flow downwardly by gravity so as to fill said passageway, and solidifying said melted preform to seal said display gas in said inner chamber.

3,914,001

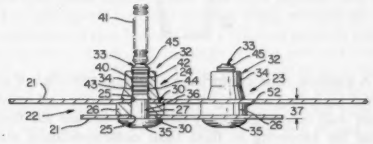
ELECTRICAL GROUNDING APPARATUS AND METHOD AND WASHER FOR USE THEREWITH

Warren J. Nelson, and Donald A. Fauth, both of Bon Air, Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Dec. 26, 1973, Ser. No. 428,005

Int. Cl.² H01R *3/06, 11/20*

U.S. Cl. 339—14 R **4 Claims**



1. An electrical grounding system adapted to be buried underground and comprising, a plurality of electrically conductive strips arranged in a grid-like pattern and having a plurality of areas of intersection and wherein immediately adjacent pairs of strips at each area of intersection are arranged transverse each other, a set of aligned openings in an associated pair of said strips at each of said areas of intersection, a plurality of electrically conductive washers corresponding in number to said plurality of areas of intersection with each washer being arranged between the associated pair of strips at its area of intersection and each washer having an opening therethrough which is aligned with an associated set of aligned openings and having an outside surface, a plurality of fasteners corresponding in number to said plurality of areas of intersection with each fastener extending through the associated set of openings and the opening in its associated washer, each of said fasteners holding the associated strips at its area of intersection in sandwiched relation against its associated washer, each washer having a thickness which is sufficient to separate said strips and minimize crevice corrosion and having a pair of opposed surfaces, each of said opposed surfaces having projections extending therefrom which bite into an associated strip upon tightening the associated fastener to hold the washer sandwiched between its strips at the associated area of intersection to thereby assure a substantially resistance free electrical connection between said strips at each area of intersection, said projections extending from each surface of each washer being arranged in a continuous spiral pattern from each washer opening to its outside surface with said projections defining an unobstructed spiral channel from the center portion of the washer to the outside thereof, each spiral projection having a substantially V-shaped config-

uration including a sharp apex enabling easy biting thereof into an associated strip, said biting providing an indentation and freshly exposed metal free of an oxide coating, and each V-shaped spiral projection having a vertical height which is roughly one-half the radial distance between the apexes of immediately adjacent projections, said vertical height assuring forming of said indentation as well as assuring said unobstructed spiral channel.

3,914,002

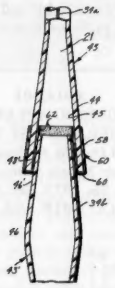
CONDUCTIVE TUBING AND METHOD OF MAKING SAME

Mayer Berliner, Lake Luzerne, and James G. Stewart, Amsterdam, both of N.Y., assignors to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Apr. 17, 1974, Ser. No. 461,563

Int. Cl.² F16L *11/12*; H05F *3/02*; A61M *25/00*; B29D *23/04*

U.S. Cl. 339—16 R **13 Claims**



1. A medical tube comprising a tubular member of plastic material including an integral connector at one end having an interior wall tapering radially outwardly toward the free end thereof for receiving in fluid tight communication another member having electrically conductive means on the exterior thereof, an electrically conductive plastic stripe adhering to and extending generally longitudinally along substantially the entire length of said tubular member for preventing the accumulation of electrostatic charges on the tube, said stripe having a width substantially narrower than that of said tubular member and having the radially outer surface thereof exposed, and a coating of electrically conductive plastic material adhering to said connector and including a coating portion on the exterior wall of said connector covering and in electrical contact with a part of said stripe, a coating portion on the interior wall of said connector extending over a substantial circumferential surface area thereof for electrical contact engagement with the conductive means on the other member when the other member is connected in fluid communication with said connector, and a coating portion on the free end of said connector electrically connecting the coating portion on the interior wall of said connector to the coating portion on the exterior wall of said connector, the thickness of said coating being less than that of the wall of said tubular member.

7. The method of making a medical tube with means for preventing the accumulation of electrostatic charges thereon and adapted for connection with another member which has conductive means thereon, comprising the steps of forming a tube of plastic material having a stripe of electrically conductive plastic material having a width substantially narrower than the width of the tube and adhering to and extending along substantially the entire length of the tube with the radial outer surface thereof exposed, and an integral tube connector at one end of the tube with the interior walls thereof tapering radially outwardly toward the free end thereof for receiving said other member in fluid tight frictional engagement, applying a liquid coating comprising an electrically conductive material and a plastic material onto said connector to coat the interior, exterior, and free end walls of said connector with the coating on the exterior of said connector extending over a portion of said stripe and in electrical contact therewith, and solidifying the coating in situ to form a conductive plastic coating adhering to said connector for connecting the conductive means of the other member when it is connected to said connector in electrical connection with said stripe.

3,914,003

SPARK PLUG SOCKET FOR INTERNAL COMBUSTION ENGINES

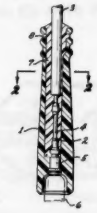
Fritz Loy, Heroldsberg, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte AG, Hannover, Germany

Filed Jan. 8, 1974, Ser. No. 431,594

Claims priority, application Germany, Dec. 14, 1972, 2261103

Int. Cl.² H01R *13/52*

U.S. Cl. 339—26 **2 Claims**



1. Socket for spark plugs for internal combustion engines, comprising a single piece socket member of elongated configuration having connection means at one end for receiving a spark plug, and being made of thermosetting plastic, the member having a central longitudinal bore, the bore having three sides integrally connected together so that said bore will have an uninterrupted periphery defined by said sides, said bore will thus have a cross-section defined by a triangle, the bore being closed except at the other end, the bore receiving at the other end a round conductor lead in tangentially abutting relationship as to each of the three sides of the bore, the three sides of the bore thus centering the lead through said abutting relationship, the bore having a wider portion at the other end, terminating in an opening through which passes the inserted conductor lead, said lead having one end thereof adapted for connection to said connection means so that the socket is an end socket for said conductor lead; and

elastomeric filler material for filling the remaining spaces between the conductor lead and the three sides of said bore for positioning the conductor lead in embedding relationship in the bore, and annularly sealing the conductor at said opening and other end.

3,914,004

ELECTRICAL CONNECTOR

Clive Bone, London, England, assignor to The Post Office, London, England

Filed Aug. 16, 1973, Ser. No. 388,909

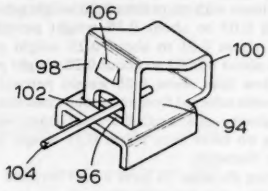
Claims priority, application United Kingdom, Aug. 23, 1972, 39283/72

Int. Cl. H01r *9/08*

U.S. Cl. 339—97 R **4 Claims**

1. An electrical connection between an insulated wire and a connector comprising a tongue and an electrically conductive support member formed with a mouth, said tongue having two opposite wire-engaging surfaces extending to a wire-engaging distal edge which is narrow in relation to the extent of each said surface and said mouth having two opposed sides respectively facing said surfaces, said tongue being integral with said support member and joined thereto by a deformable

link which is deformable about a line generally parallel to the sides of said mouth, wherein said wire is conformed to each said surface and said edge and is gripped between each said



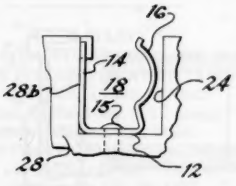
surface and facing side, and insulation is stripped from the core of said wire over a length thereof extending distally from at least one said side, which side is formed to penetrate said insulation and is in electrical contact with said core.

3,914,005

REJECTION TYPE FUSE HOLDER

Robert S. Tillson, Terryville, Conn., assignor to General Electric Company, New York, N.Y.

Division of Ser. No. 433,824, Jan. 16, 1974, Pat. No. 3,890,032. This application Dec. 12, 1974, Ser. No. 532,009
Int. Cl.² H01R *13/64*
U.S. Cl. 339—186 R **4 Claims**



1. A fuse clip for accommodating a fuse end terminal appropriately keyed with a special recess, said fuse clip comprising, in combination:

A. a pair of spaced arms defining therebetween a pocket having a constricted opening for receiving a fuse end terminal, at least one of said arms being deflectable to accommodate enlargement of said pocket opening;

B. interference means approximate one of said arms and extending laterally into said pocket adjacent said opening;

C. limiting means disposed externally of said pocket adjacent said deflectable arm for limiting the deflection thereof so as to establish a maximum separation of said arms at said pocket opening corresponding to the major lateral dimension of a fuse end terminal having the keyed recess for accommodating said interference means upon insertion, said interference means engaging the outer surface of a fuse end terminal lacking the keyed recess to increase the separation of said arms at said pocket opening necessary for insertion to a spacing which is prohibited by said limiting means, thereby to reject insertion thereof; and

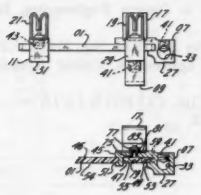
D. a mounting block for supporting said arms, said limiting means being provided by a surface of said block.

3,914,006

METER SOCKET

Gary Hayward, Scarborough, Canada, assignor to Federal Pacific Electric Company, Newark, N.J.

Filed Jan. 25, 1974, Ser. No. 436,735
Int. Cl.² H01R *9/00*
U.S. Cl. 339—198 M **10 Claims**



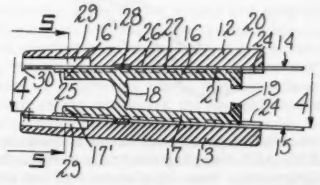
1. A meter socket including a base plate of electrical insulation having first and second sides, first and second edge portions spaced apart from each other in a direction parallel to said first side and a plurality of plug-in terminals for receiving terminal blades of a meter, at least certain of said plug-in terminals having a meterblade-receiving clip member, a combined mounting and terminal member and a fastener, said combined mounting and terminal member including terminal means for fastening a wire thereto, a first portion overlying said first side of said base plate adjacent said first edge portion thereof and said first portion bearing said clip member, a second portion extending across and closely adjacent to said first edge portion and a lip portion overlying said second side of said base plate adjacent said first edge portion, said combined mounting and terminal member being movable as a unit in the absence of said fastener into a released position wherein said lip portion clears said first edge portion and said terminal member is released from said base plate, said fastener having a portion extending from said first portion of said terminal member into position closely adjacent said second edge portion of said base plate when said second portion of said terminal member is closely adjacent to said first edge portion for preventing movement of said terminal member into said released position, said fastener additionally securing said clip member to said combined mounting and terminal member.

3,914,007

TEST CLIP

Jack Seidler, New Rochelle, N.Y., assignor to Continental Specialties Corporation, New Haven, Conn.

Filed June 24, 1974, Ser. No. 482,157
Int. Cl.² H01R *11/22*
U.S. Cl. 339—255 P **9 Claims**



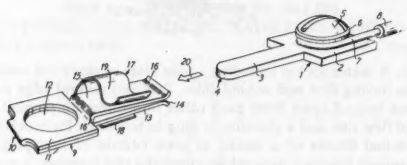
1. A clip for connecting the leads of an electrical component to testing equipment comprising, a core unit constituted by upper and lower flat plates joined intermediate their ends by a deformable web, a plurality of elongated conductive elements extending across a surface of at least one plate and projecting beyond both ends of said plate, and at least one cover member fixed to said surface in a position to hold said conductive elements in place and to cover the projecting ends

thereof at one end of the plate while leaving exposed the projecting ends at the other end of the plate.

3,914,008
CONNECTORS

Betty Ruth Hollander, Stamford; Theodore Anthony Coppola, Norwalk, and William Earl McKinley, Stamford, all of Conn., assignors to Omega Engineering, Inc., Stamford, Conn.

Filed May 31, 1974, Ser. No. 475,323
Claims priority, application United Kingdom, June 18, 1973, 28830/73
Int. Cl.² H01R *13/16*
U.S. Cl. 339—259 R **7 Claims**



1. A female plug assembly for an electrical connector comprising: a female connector member having at least one single-fold metal element which includes two leaves, each of said leaves having a base area and a tongue area extending from said base area, said base areas of said leaves being superposed and said tongue areas of said leaves being superposed, one said leaf having said tongue area in the same plane as said base area, the other said leaf having said tongue area out of the plane of said base area, said tongue areas being spaced at least adjacent said base areas to receive a male element between them, and a clip member passing around the lateral edges of said tongue areas, said clip member having two arms including a substantially flat arm engaging the entire width of one tongue and a curved arm engaging the outside opposite surface of the other tongue to press the contact areas of the tongues together.

3,914,009
ELECTRICAL CONTACT DEVICE AND METHOD OF PREPARATION THEREOF

Enrique Chia; Herbert M. Hanegan, and Paul S. Keith, all of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Continuation-in-part of Ser. No. 200,576, Nov. 19, 1971, abandoned. This application Nov. 19, 1973, Ser. No. 417,177
Int. Cl.² H01R *3/02*
U.S. Cl. 339—278 C **26 Claims**

1. An electrical contact device having a minimum conductivity of 57% IACS consisting essentially of more than about 0.02 weight percent iron, from about 0.07 to about 0.35 weight percent magnesium, from about 0.01 to about 0.25 weight percent silicon, from about 0.0003 to about 0.02 weight percent copper, less than about 0.05 weight percent each of trace elements selected from the group consisting of vanadium, manganese and zinc, and from about 97.25 to about 99.78 weight percent aluminum, said alloy containing no more than about 0.15 total weight percent of said trace elements, said contact device having improved thermal stability — when compared against conventional EC aluminum devices — which renders said contact device capable of withstanding current cycling over an extended period of time, without failure.

11. A process for preparing an electrical contact device having a minimum conductivity of at least 57% IACS comprising the steps of:

a. Alloying from about 97.25 to about 99.78 weight percent aluminum with more than 0.20 weight percent iron, from about 0.07 to about 0.35 weight percent magnesium, from about 0.01 to about 0.25 weight percent silicon, from about 0.0003 to about 0.20 weight percent copper, and less than about 0.05 weight percent each of trace elements selected from the group consisting of vanadium, manganese and zinc, the total trace element content being no more than about 0.15 weight percent of said trace elements;

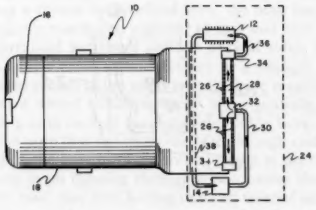
b. Casting the alloy to form a cast bar; and

c. Forming the bar with no preliminary or intermediate anneals into the contact device, said contact device having improved thermal stability — when compared against conventional EC aluminum devices — which renders said contact device capable of withstanding repeated current cycling over an extended period of time, without failure.

3,914,010
LIQUID LONG-WAVE PASS FILTER FOR HIGH INTENSITY LIGHT SOURCE

Sanford S. Zeller, Greenbrae, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 25, 1974, Ser. No. 527,182
Int. Cl.² G02B *5/24*
U.S. Cl. 350—3 **7 Claims**



1. A liquid long-wave pass filter for a high intensity light source, the filter comprising:

two circular glass lenses in close proximity to each other and in the path of light emitted from said high intensity light source, said lenses forming the end faces of a liquid tight cavity therebetween with an inlet distribution chamber at the center of said cavity and an outlet manifold around the periphery of said cavity;

a dye coolant liquid having visible light wavelength absorbing and infrared wavelength passing characteristics enclosed in a closed circulation system, said dye coolant comprising 95% silicone oil and 5% iodine crystals by weight;

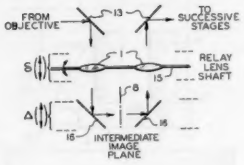
means for circulating said dye coolant through said cavity by entering through said inlet distribution chamber for circulating radially outward from said inlet distribution chamber and exiting out said outlet manifold wherein said dye coolant absorbs said visible light and passes said infrared light through said lenses; and

means for cooling said dye coolant after passing through said outlet manifold for removing heat generated by absorption of said visible light.

3,914,011
CASCADED RELAY FOR IMPROVED SCHEIMPFLUG PROBE

Richard B. Mallinson, and Richard A. Mecklenborg, both of Binghamton, N.Y., assignors to The Singer Company, New York, N.Y.

Filed Sept. 10, 1974, Ser. No. 504,827
Int. Cl.² G02B *17/00, 23/02*
U.S. Cl. 350—50 **12 Claims**



1. In an optical system, apparatus for achieving Scheimpflug correction of an image tilted with respect to the optical axis of the system using Scheimpflug relay lenses comprising:

a. a shaft intersecting the optical axis of the system at right angles upon which are mounted a multiplicity of Scheimpflug relay lenses, said lenses having their optical axes transverse to the axis of said shaft;

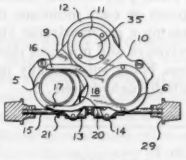
b. means for rotating said shaft with the lenses mounted thereon, to achieve Scheimpflug correction of a tilted image;

c. reflective means for bending the optical path to direct light in opposite directions through alternate ones of said relay lenses.

3,914,012
BINOCULAR BODY FOR MICROSCOPE PERMITTING VARIATION OF INTERPUPILARY DISTANCE WITHOUT COMPENSATING LENSES

Olin W. Boughton, Williamsville, N.Y., assignor to American Optical Corporation, Southbridge, Mass.

Filed May 21, 1973, Ser. No. 362,589
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G02B *21/20, 27/36*
U.S. Cl. 350—75 **5 Claims**

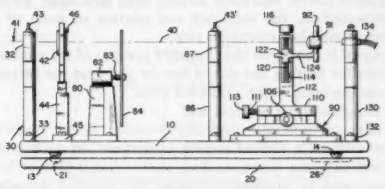


1. In a microscope binocular assembly having a pair of members pivotable about a common axis and each carrying an eyepiece holder to provide accommodation for interpupilary distance, one eyepiece holder being mounted to rotate about its axis, the improvement comprising a rigid link fixed to said one eyepiece holder and slidably engaging the other eyepiece holder so that said one eyepiece holder will rotate during movement to accommodate interpupilary distance and maintain orientation of a reticle in an eyepiece held therein.

3,914,013
COHERENT RADIATION BEAM COUPLER

Larry Rosenberg, 115 N. Wetherly Drive, Beverly Hills, Calif. 90211

Filed Jan. 7, 1974, Ser. No. 431,087
Int. Cl.² G02B *5/16;* **A61N** *5/06*
U.S. Cl. 350—96 B **1 Claim**



1. As an article of manufacture, adapted for use in internal surgery with an endoscope, a coupler device for focusing and concentrating a laser beam on to a fiber optics element comprising in combination: a base having mounted on it an assembly including adjustable iris diaphragm means and second spaced iris diaphraghm means aligned along the laser beam axis for controlling the size and volume of the beam: means for directing a beam of coherent radiation along said axis and through said diaphragm means; an adjustable focusing lens positioned in alignment with said axis: means for holding an end part of a fiber optics element in alignment with said axis at one end of said base to receive a concentrated laser beam focused on ends of the fiber optic elements, shutter means having alignment with said axis and having the capability of timed interceptions of the beam, chopper means having an element movable in a position to interrupt said beam and to thereby control the energy of the beam and a support stand carrying said focusing lens adjustable relative to three mutually normal axes for purposes of focusing.

3,914,014
CONNECTOR ASSEMBLY FOR A BOTTOM-DRAG SEISMIC CABLE

Harlan A. James, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Aug. 23, 1974, Ser. No. 499,867
Int. Cl.² H01R *13/58*
U.S. Cl. 339—104 **7 Claims**

1. A connector assembly for joining two drag-cable sections, each cable section including a central stress member, a plurality of conductors surrounding said stress member, an insulating waterproof jacket enclosing said stress member and said plurality of conductors, and a bouyant cellular plastic covering surrounding said jacket, the assembly comprising:

a pair of perforated bulkhead members securable to each of the opposing ends of two, spaced-apart cable sections;

a pair of stress-member extension pins having a hollow end portion and an externally-threaded end portion, removably mounted to extend through the center of each bulkhead member;

an elongate stress section; and

a pair of union means coupling said stress section to said extension pins.

2. A connector assembly for joining two drag-cable sections, each cable section including a central stress member, a plurality of conductors surrounding said stress member, an insulating waterproof jacket enclosing said stress member and

said plurality of conductors, and a buoyant cellular plastic covering surrounding said jacket, the assembly comprising:

a pair of perforated bulkhead members securable to each of the opposing ends of two, spaced-apart cable sections;

a pair stress-member extension pins each having a hollow end portion and an externally-threaded end portion, removably mounted to extend through the center of each bulkhead member;

a pair of sleeve nuts each having inner and outer threads, mounted on the threaded end portion of each of the stress-member extension pins;

a pair of locknuts on the threaded portion of the extension pins for locking the sleeve nuts in place on the threaded end portions of the extension pins;

an elongate stress section; and

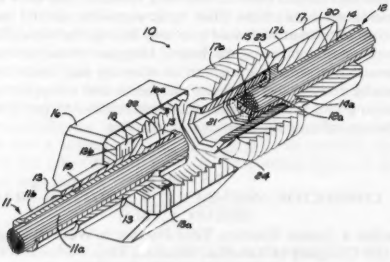
a pair of hollow, internally-threaded collar members mounted for limited sliding movement on each end of said elongate stress section, said collar members being arranged to threadably engage the external threads of said sleeve nuts.

3,914,015

FIBER OPTIC CONNECTOR AND ASSEMBLY METHOD

Ronald L. Mc Cartney, Orange, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 15, 1974, Ser. No. 514,820
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C **9 Claims**



7. A fiber optic cable comprising:

a fiber optic bundle;

a hollow termination pin having an axial bore therein substantially only large enough to receive said fiber optic bundle, said bundle having an end portion mounted in said bore;

said bore having a polygonal configuration; and

said pin being fabricated from shrinkable metal material whereby warming after assembly causes said pin to shrink sufficiently to arrange the fibers of said bundle to conform to the cross-sectional configuration of said bore as a consequence of the radially inwardly directed force resulting from said shrinking.

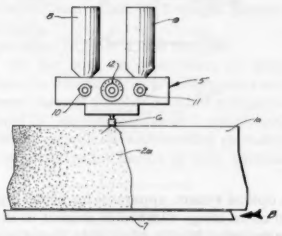
3,914,016

PRODUCTION OF GRADIENT DENSITY LIQUID CRYSTAL FILTER

John F. Dreyer, Cincinnati, Ohio, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 348,943, April 9, 1973, abandoned. This application Nov. 26, 1974, Ser. No. 527,205
Int. Cl.² G02B 5/30, 5/22; C03C 17/28
U.S. Cl. 350—155 **14 Claims**

10. A gradient density light transmissive filter comprising a light transmissive substrate having a directionally oriented surface, a light transmissive film on the directionally oriented surface of the substrate, said film consisting of dichroic substance having a nematic liquid crystal phase, the optical density of the dichroic substance varying in a smooth gradient from area to area of said substrate in a predetermined density pattern, the substrate being non-absorptive with respect to the dichroic substance, said film being characterized by having been formed by applying a solvent solution of the dichroic



substance to the substrate in a coating of substantially uniform thickness in which the concentration of the dichroic substance is varied from area to area in accordance with the predetermined density pattern and the applied coating dried to eliminate the solvent, the optical density of the dry film directly corresponding to the concentration of the solvent solution.

3,914,017

K-SHEET TYPE POLARIZERS PREPARED FROM POLYVINYL ALCOHOL GRAFT COPOLYMERS

Stanley F. Bedell, Andover, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Nov. 5, 1973, Ser. No. 412,541
Int. Cl.² G02B 5/30, 27/28
U.S. Cl. 350—154 **12 Claims**

1. A dichroic light polarizer comprising a transparent sheet of a graft copolymer, said graft copolymer comprising a polyvinyl alcohol backbone onto which are grafted polymeric substituents selected from polymerized monomers having a polymerizable vinyl group on each monomer derivative polymerized monomers having a polymerizable vinylidene group on each monomer derivative and mixtures thereof, said polyvinyl alcohol backbone being substantially molecularly oriented and at least partially dehydrated.

3,914,018

YTTRIUM ORTHOVANADATE OPTICAL POLARIZER

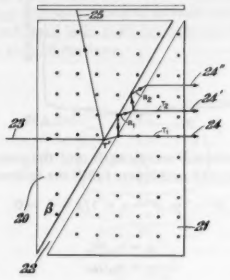
Larry G. DeShazer, Palos Verdes, Calif., assignor to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 148,684, June 1, 1971, abandoned. This application Nov. 20, 1973, Ser. No. 417,557
Int. Cl.² G02B 1/24
U.S. Cl. 350—157 **6 Claims**

1. An optical polarizer having the Glan-Foucault, Rochon or Wollaston configuration and consisting essentially of undoped yttrium orthovanadate as a birefringent material.

5. Apparatus comprising in combination (a) a laser and (b)

a polarizer consisting essentially of undoped yttrium orthovanadate disposed in the path of the laser output beam for



increasing the degree of polarization of said laser output beam.

3,914,019

LIQUID CRYSTAL DISPLAY ARRANGEMENTS

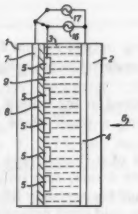
Dennis William George Byatt, Chelmsford, England, assignor to The Marconi Company Limited, Chelmsford, England

Filed Feb. 19, 1974, Ser. No. 443,757

Claims priority, application United Kingdom, Mar. 8, 1973, 11364/73

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **13 Claims**



1. A liquid crystal display cell comprising not more than one layer of liquid crystal material and which material is of the storage type; two electrodes arranged one on each side of the liquid crystal material, at least one of which two electrodes is a pattern electrode which contacts and incompletely covers one side of the liquid crystal material so as to provide a desired display and to leave the remainder of said one side uncovered by said pattern electrode and the other of which two electrodes is in contact with said layer; a further electrode and an insulating layer disposed between and in contact with said pattern and said further electrode, which further electrode at least covers said remainder of said one side of the liquid crystal material; and conductor means connected to each of said two and said further electrode and extending therefrom for external connection whereby signals may be applied respectively for clearing an initial cloudiness in the liquid crystal material, for generating localized cloudiness according to the pattern of said pattern electrode and for erasing localized cloudiness according to the pattern generated.

3,914,020

ELECTRO-OPTICAL CELL

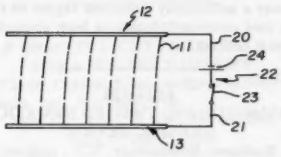
Wolfgang Helfrich, Magden, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Oct. 31, 1974, Ser. No. 519,581

Claims priority, application Switzerland, Nov. 2, 1973, 15449/73

Int. Cl.² G02F 1/13

U.S. Cl. 350—160 LC **5 Claims**



1. An electro-optical cell comprising a nematic liquid crystal means sandwiched between two transparent plate means, each of said plate means including an electrode means, the surface of each plate means facing the liquid crystal means being treated so as to possess an orienting force which causes the molecules of the liquid crystal means to orient themselves directionally at the facing surface of each plate, the orienting force at one surface being substantially smaller in magnitude than the orienting force at the other surface, said molecules being disposed parallel with each other, with the long axis thereof being approximately perpendicular to the surfaces which exert an orienting effect on the molecules, said liquid crystal means having a dielectric anisotropy of about zero and having a substantially homeotropic texture in the absence of an electric field, polarizing means, one disposed in front of and one behind the liquid crystal means in a crossed arrangement and in the direction of transmitted light.

3,914,021

LIQUID CRYSTAL DISPLAY DEVICE WITH IMPROVED CONTACT MEANS

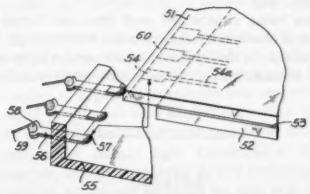
Izuhiko Nishimura, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Continuation-in-part of Ser. No. 269,694, July 7, 1972, abandoned. This application May 3, 1974, Ser. No. 466,947

Claims priority, application Japan, July 9, 1971, 46-50872

Int. Cl.² G02F 1/16

U.S. Cl. 350—160 LC **10 Claims**



1. In a liquid crystal display device comprising opposing insulating plates and a spacer defining a chamber containing liquid crystals, at least one conductive area on the interior of each of said plates and within the display region of said device, a separate contact area proximate an edge of at least one of said plates and exterior to said spacer, said contact areas corresponding in number to the number of conductive areas on said plates, and a strip lead connecting each conductive area to a corresponding contact area, the improvement wherein said insulating plates are of such size and are so positioned that at least one edge of one plate having contact areas proximate said edge projects beyond an edge of the

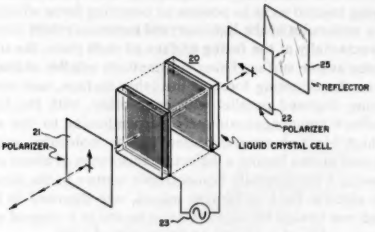
other of said opposing plates, thereby making the contact areas proximate said extended edge readily accessible for connection to an outside source of voltage, and comprising a plurality of resilient conductive fingers for making contact with each of said contact areas and mounting means holding said fingers as a unit and shaped for holding said fingers firmly in mechanical contact with said contact areas when said mounting means is brought into registry with said plates, said fingers being so shaped and so disposed in said mounting means that each of said fingers makes contact with a corresponding contact area under a sufficiently high bising spring force and over a sufficiently restricted region so that contact pressure in said restricted region is high enough to ensure good electrical contact.

3,914,022

QUASI-HOMEOTROPIC TWISTED NEMATIC LIQUID CRYSTAL DEVICE

Richard A. Kashnow, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed July 2, 1974, Ser. No. 485,305
Int. Cl.² G02F 1/13
U.S. Cl. 350—160 LC **6 Claims**



1. A liquid crystal device comprising:
a polarizer for polarizing light entering said device;
an analyzer for analyzing light after passage through said device;
a first boundary substrate;
a second boundary substrate, parallel to and spaced from said first substrate;
said first and second substrates each having transparent electrodes on the interior surfaces thereof;
a negative dielectric anisotropy, nematic liquid crystal material filling the volume defined by said first and second substrates; and
said device being contructed such that said liquid crystal material is characterized by a quasi-homeotropic boundary condition in the quiescent state, and a homogeneous twisted nematic bulk molecular arrangement in the active state.

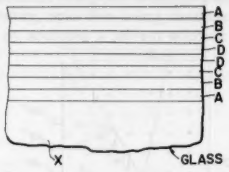
3,914,023

WIDE-BAND MULTILAYER INTERFERENCE FILTER

Alfred Thelen, Furstentum, Liechtenstein, assignor to Balzers Patent-und Beteiligungs-AG., Liechtenstein

Filed Dec. 5, 1973, Ser. No. 421,797
Claims priority, application Switzerland, Dec. 8, 1972, 17946/72
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G02B 5/28
U.S. Cl. 350—164 **8 Claims**

1. A wide-band multilayer interference filter in which the stopbands of higher order are partly suppressed, comprising a filter having a periodic arrangement of layers of the structure ABCDDCBA, where A,B,C,D indicate individual layers having each an optical thickness of one-fourth of the predetermined constructional wavelength and the mutually different refraction indices of said layers fulfill the following conditions:



$$y^2 - 2y \cdot x^2 - x + 1/x + 1 = 0$$

where

$$x = n_A/n_B$$
$$y = n_B/n_C$$

and

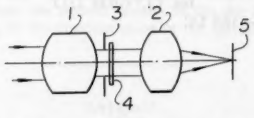
$$n_A\, n_D = n_B\, n_C$$

3,914,024

PHOTOGRAPHIC OBJECTIVE HAVING A POLYESTER BASE COLOR TEMPERATURE CONVERSION FILTER

Akira Tanabe, Yokohama; Akira Tajima, and Naoto Kawamura, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 20, 1974, Ser. No. 453,047
Claims priority, application Japan, Mar. 23, 1973, 48-35303; Mar. 29, 1973, 48-38144
Int. Cl.² G02B 5/22
U.S. Cl. 350—196 **12 Claims**



1. A photographing optical system for providing an image to a photosensitive material at an image plane, comprising:
an objective lens;
a diaphragm disposed in the optical path of said objective lens and forming a pupil plane of the photographing optical system;
a filter composed of a filter frame and a polyester sheet mounted on said frame, said polyester sheet having an absorbed dyestuff for centrally filtering light in the vicinity of ultraviolet, said dyed polyester sheet for converting color temperature of light transmitted by said objective lens to correspond to the spectral sensitivity of said photosensitive material at the image plane of the objective lens; and
a filter supporting means for supporting said filter and for allowing said filter to be movable into and out of the optical path of the objective lens in accordance with the need to conform the color temperature of scene illumination to said photosensitive material.

3,914,025

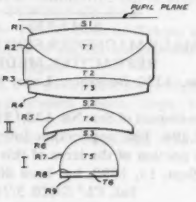
MICROSCOPE CONDENSER

Alois F. Dehlink, Vosendorf, Austria, assignor to C. Reichert Optische Werke AG, Vienna, Austria

Filed Dec. 14, 1973, Ser. No. 425,035
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G02B 21/08
U.S. Cl. 350—229 **1 Claim**

1. A microscope condenser having a numerical aperture of 1.30 and composed of the following components:

a first component I comprised of a doublet composed of a plane parallel plate cemented to a hemispherical lens;
a second component II comprised of a meniscus positive lens; and
a third component III, composed of a convex positive triplet in which the parameters of lens radii (R), thicknesses (T), and spacings (S) are expressed in millimeters and a negative sign indicates lens radii on centers of curvature on the object side of the lens

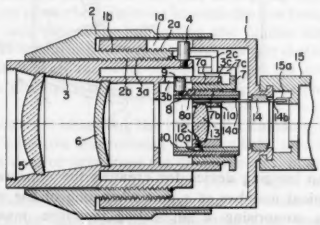


Radius R	Thickness T	Space S	Refractive Index ND	Abbe Number ν
R1= 26.752				
	T1=8.10		ND1=1.64049	ν1=60.1
R2= −21.042				
	T2=1.50		ND2=1.79504	ν2=28.4
R3= 52.427				
	T3=2.70		ND3=1.69680	ν3=55.4
R4=−108.3				
		S2=0.11		
R5= 14.898				
	T4=3.25		ND4=1.69680	ν4=55.4
R6= 23.216				
		S3=0.11		
R7= 7.976				
	T5=9.30		ND5=1.69680	ν5=55.4
R8= PLANO				
	T6=1.00		ND6=1.63636	ν6=35.3
R9= PLANO				

3,914,026
SHORT-DISTANCE CORRECTION DEVICE IN A PHOTOGRAPHIC LENS

Hideo Kanno, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Nov. 7, 1973, Ser. No. 413,609
Claims priority, application Japan, Nov. 13, 1972, 47-129692
Int. Cl.² G02B 7/04
U.S. Cl. 350—255 **9 Claims**

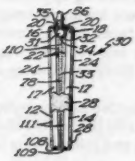


1. A photogtraphic lens including a short-distance correction device, the photographic lens being adapted for use in a first mode for close-up photography wherein the photographic lens is mounted on a camera body by means of an intermediate ring and being adapted for use in a second mode wherein the photographic lens is directly mounted on a camera body, said correction device comprising a corrections lens cooperable with a distance ring on the photographic lens for varying the axial position of the correction lens in the photographic lens in response to rotation of the distance ring and means for selecting a first range of axial positions for the correction lens when the photographic lens is used in said first mode and a second range of axial positions for the correction lens when the photographic lens is used in said second mode, whereby short-distance correction is achieved during both the first and second modes.

3,914,027
VARIABLE OPACITY LIGHT FILTERING APPARATUS FOR A WELDER'S HELMET

Thomas E. Caron, Crystal, Minn., assignor to Nu-Vu Company of Wisconsin, Inc., Nashotah, Wis.

Filed Oct. 1, 1973, Ser. No. 402,588
Int. Cl.² G05D 25/00
U.S. Cl. 350—267 **8 Claims**

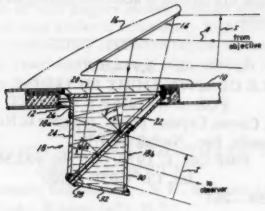


1. A variable opacity light filtering apparatus comprising:
a pair of fluid impervious panels having at least partial transmission of the visible light spectrum, said panels being in confronting juxtaposed relationship with one another and having matching, closely adjacent peripheries;
a stretchable seal interconnecting said peripheries of said panels and forming a fluid tight seal between said peripheries to define a fluid receiving chamber between said panels and seal, said seal being stretchable to permit movement of said panels between an unextended position wherein said panels are spaced a first distance apart and an extended position wherein said panels are spaced a second distance apart, each said panel having an elongated edge with a bevel therealong, said edges being adjacent and parallel and the bevels confronting one another and cooperating to define a slot therebetween; and
a fluid transfer device connected in fluid flow relationship to said chamber and including light obstructing fluid, said transfer device selectively delivering said fluid to said chamber to urge said panels and said seal from said unextended position to said extended position as fluid flows into said chamber to increase opacity of said chamber to substantially reduce light transmission through said chamber, said fluid transfer device including an elongate manifold adhesively retained by said seal and having a plurality of exit orifices for fluid, said manifold being within said chamber adjacent said slot and oriented parallel to said edges and positioned to release fluid from said exit orifices into said slot, said manifold being moved toward and away from said slot by said seal and descending into said slot as said panels and said seal move to extended position so the manifold wedges said panels apart to increase the rate at which said fluid fills said chamber, said manifold ascending from said slot as said panels and seal return to unextended position to increase the rate at which fluid leaves said chamber and enters said fluid transfer means.

3,914,028
PERISCOPIC VIEWING SYSTEM

William W. Toy, 459 Henley Drive, Bloomfield Hills, Mich. 48013

Division of Ser. No. 215,498, Jan. 5, 1972, Pat. No. 3,784,288. This application Jan. 7, 1974, Ser. No. 431,368
Int. Cl.² G02B 7/18
U.S. Cl. 350—287 13 Claims

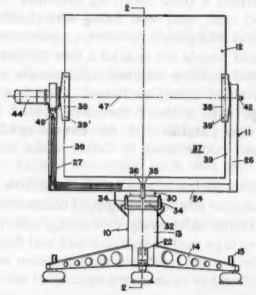


1. In a periscopic viewing apparatus
a prismatic structure having an image receiving face, interiorly reflective faces and a viewing face, the image received through said receiving face being transmitted to said reflecting faces and thence outwardly through said viewing face,
said prismatic structure further comprising a housing and an optical wedge, said interiorly reflective faces being a part of said housing and said viewing face being a part of said optical wedge,
an adjusting means for simultaneously adjusting said viewing face and one of said reflecting faces.

3,914,029
MIRROR ASSEMBLY

Donald A. Hoplock, 2801-55 Nassau St., Winnepeg, Manitoba, Canada

Filed Apr. 25, 1974, Ser. No. 464,068
Int. Cl.² G02B 5/08; A47G 1/24
U.S. Cl. 350—289 6 Claims

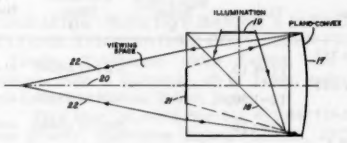


1. A mirror assembly in conjunction with a source of electrical energy and comprising in combination a base, a yoke extending upwardly from said base, first electric motor means connected to said source of electrical energy, a drive shaft for said first electric motor means, said drive shaft being operatively connected to said yoke for rotating said yoke within limits, around a first axis, a planar mirror component bearingly mounted within the arms of said yoke, and second electric motor means connected to said source of electrical energy, a drive shaft for said second electric motor means, said drive shaft being operatively connected to said mirror component for rotating same within limits, around a second axis within said yoke, at right angles to said first axis, said base including a central standard extending upwardly therefrom, said first electric motor being mounted within said standard, said yoke including a mounting shaft, a bearing in said standard above said first electric motor means, said mounting shaft being supported for rotation within said bearing and being operatively connected to the drive shaft of said first electric motor means, and means to control the degree of rotation of said yoke, said last mentioned means including a striker plate secured to said yoke, a pair of microswitches operatively connected between said first electric motor means and said source of electrical energy, and being engageable by said striker plate at the extremities of rotation of said yoke.

3,914,030
VIRTUAL IMAGE MAGNIFIER SYSTEM FILLED WITH A REFRACTIVE MEDIUM

Helmut Weiss, 1230 Berkshire Lane, Newport Beach, Calif. 92660

Continuation-in-part of Ser. No. 133,191, April 12, 1971, Pat. No. 3,758,196. This application July 18, 1973, Ser. No. 380,448The portion of the term of this patent subsequent to Sept. 11, 1990, has been disclaimed.
Int. Cl.² G02B 5/10
U.S. Cl. 350—296 7 Claims

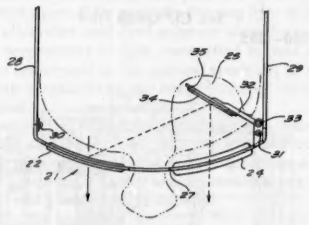


1. In a virtual image magnifier system comprised of a magnifying concave mirror surface means, a plane semitransparent mirror means oriented such that the physical object to be magnified does not obstruct the observer's view at the magnified virtual image, the improvement which comprises refractive material filling the space between said magnifying concave mirror and said semitransparent mirror, said refractive material having an index of refraction greater than one.

3,914,031
IMAGING DEVICE FOR CREATING THE APPEARANCE OF A MISSING ANATOMICAL MEMBER

Hampson A. Sisler, 34 W. 12th St., New York, N.Y. 10011

Filed Aug. 14, 1974, Ser. No. 497,338
Int. Cl.² G02B 7/18; G02C 1/00
U.S. Cl. 350—298 6 Claims



1. An imaging device for creating the appearance of an anatomical member of a pair when one of the members is missing comprising: a supporting structure, means on the supporting structure for removably mounting the imaging device on a human being at the location of the missing and present anatomical members, imaging sensing and projecting means on the supporting structure and positioned so that the image of the present anatomical member is displaced to the location of the missing anatomical member and the image projected from the location of the missing anatomical member

matches the present anatomical member with respect to size, contour and actual direction of movement without distortion of the image, the image sensing and projecting means being designed and located for minimum visual detection by an observer of the wearer to enhance the illusion that both anatomical members are present, and the device containing no moving parts when mounted on the wearer and in use.

3,914,032
DEVICE FOR OBSERVING AND PHOTOGRAPHING THE FUNDUS OF EYE

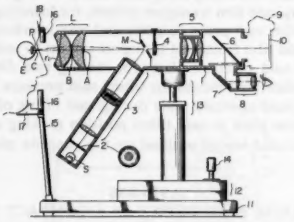
Eiichi Takano; Kunio Takesi, both of Tokyo, and Isao Matsumura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 14, 1973, Ser. No. 397,363

Claims priority, application Japan, Sept. 16, 1972, 47-92230

Int. Cl.² A61B 3/14; G02B 3/04

U.S. Cl. 351—7 **13 Claims**



1. A device for observing and photographing the retina of a human eye comprising:

positioning means for fixedly establishing the position of the eye to be examined, a fundus inspection optical system comprising an objective lens having an optical axis, a reflecting means obliquely provided on said optical axis of said objective lens and an observing optical system for observing and photographing the retina of the eye being examined, said observing optical system being provided on said optical axis of said objective lens, and an illuminating optical system having an optical axis crossing with said optical axis of said objective lens and comprising a light source and a projection lens group, wherein the light from said illuminating optical system is reflected at said reflecting means to the eye through said objective lens, said objective lens comprising a front lens group and a rear lens group said front lens group being closer to the eye and said rear lens group being closer to said observing optical system, the surface of the front lens group having the greatest power being convex towards said observation side and the surface of the rear lens group having the greatest power being convex towards the eye being examined, and means for supporting the fundus inspection optical system and for adjusting the position thereof, both of said lens groups being positioned along the axis closer to the position at which the positioning means places the eye.

9. A device for observing the retina of a human eye, comprising an objective lens forming a path of light, an observing lens in the path of light from the objective lens, illuminating means for projecting light across the path of light, reflecting means between the objective lens and the observing lens located to direct light from the illuminating means toward the objective lens, said reflecting means being formed and located to permit at least a portion of the light from the objective lens to bypass the reflecting means, said objective lens comprising a front lens group directed outwardly from the objective lens and a rear lens group positioned closer to the observing lens, said front lens group having a front surface with a center of curvature located beyond the end of the objective lens away from the observing lens, said objective lens having a non-spherical surface.

3,914,033
APPARATUS FOR PHOTOGRAPHING ANIMATION FILMS

Yoshihiro Iwai, Tokyo, and Kunihiko Tanaka, Takamatsu, both of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

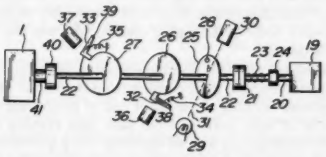
Filed Apr. 9, 1973, Ser. No. 349,177

Claims priority, application Japan, Apr. 20, 1972, 47-39096

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl. G03B 21/32

U.S. Cl. 352—87 **13 Claims**



1. An apparatus for photographing animation films comprising:

a cinecamera having an optical system and a main shaft upon every rotation of which through a predetermined angle, frames of a film are photographed and fed one by one,

torque producing means having an output shaft selectively rotatable in a normal or a reverse direction at a constant speed corresponding to the speed at which the frames are fed,

a rotatable shaft having first and second ends,

friction disc clutch means coupling the first end of said rotatable shaft to said output shaft,

rotational speed detecting means operatively connected to said rotatable shaft for detecting a revolution number of said rotatable shaft and for producing an output proportional to the number of frames fed per unit of time,

restraint means coupled to the rotatable shaft for selectively starting and stopping the rotation of the rotatable shaft,

a coupling for connecting the second end of said rotatable shaft to said cinecamera,

a coincidence circuit connected to said detecting means for comparing the output of said detecting means with a preselected value to provide a coincidence output,

means for controlling said restraint means in response to the output of said coincidence circuit to start rotation of said rotatable shaft and to stop rotation after said rotatable shaft has rotated through said perdetermined angle.

a television camera,

a luminous flux divider interposed in the optical system of said cinecamera for directing a portion of the light from said optical system to said television camera,

said television camera adapted to receive an incident luminous flux which is divided at said luminous flux divider interposed in the optical system of said cinecamera,

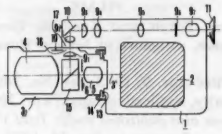
and a mointor for monitoring the output from said television camera.

3,914,034

CAMERA SYSTEM, ESPECIALLY MOTION PICTURE CAMERA SYSTEM WITH INTERCHANGEABLE LENSES

Yoshio Komine, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 11, 1974, Ser. No. 504,893
Claims priority, application Japan, Sept. 14, 1973, 48-104316; Oct. 1, 1973, 48-111246
Int. Cl.² G03B 3/00
U.S. Cl. 352—142 13 Claims



1. In a motion picture camera system having a camera body and a lens unit and wherein said lens unit is selected from a group of interchangeable lens units removably mountable on said camera body by engaging means, wherein the improvement comprises:

a housing for said lens unit having a first opening for permitting incidence of light coming from the object at one end, a second opening at the other end of permitting the emergence of light derived from said light coming from said first opening and a third opening being provided therein; photographic optics, disposed within said lens housing, including a focusing optical unit and a relay optical unit, said focusing unit being movable along the optical axis, said relay optical unit being fixed in position;

light beam controlling means for controlling quantity of light from the object after it passes through said first opening, said controlling means being disposed between said focusing optics and said relay optics;

beam splitting means being disposed between said focusing optics and said light beam controlling means, said splitting means for splitting a first light beam from said first opening into a second light beam for said second opening and a third light beam for said third opening;

said camera body having a first opening at the position corresponding to the second opening of said unit of interchangeable lenses when said lens unit is mounted on said camera body and wherein said camera body includes a second opening cooperating with said third opening of said lens unit;

and finder optics, part of which is disposed behind said second camera opening, for transmitting said third beam from said splitting means in said lens unit so as to provide a bright image of said object.

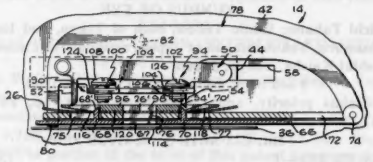
3,914,035

FILM TRANSPORT AND REGISTRATION SYSTEM FOR MOTION PICTURE CAMERA

Paul M. Satterfield, 737 N. Seward St., Hollywood, Calif. 90038

Filed Feb. 4, 1974, Ser. No. 439,098
Int. Cl.² G03B 1/22
U.S. Cl. 352 -191 23 Claims

1. In a camera, the combination of film transport and film registration systems cooperating with each other in a timed sequence for registration of a film for exposure of one frame, and following exposure, to transport the film for registration and exposure of another frame, said film transport system comprising means for intermittent lateral motion of said film, said film registration system comprising a base member, pilot pin means extending from base member, an aperture plate positioned adjacent said base member, an arm, said aperture plate and said arm hinged on a common axis, a pressure plate mounted on said arm, said pilot pin means being arranged for positioning a film between said aperture plate and said pressure plate, said pressure plate and said aperture plate being disposed substantially parallel to each other in the seated position of said film on said pilot pin means, means for lifting said arm and said aperture plate together on said axis, to transfer said film by said aperture plate from said pilot pin



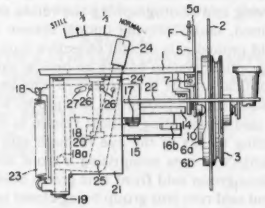
means to said film transport system, and following transport of said film by said film transport system, for lowering said arm together with said pressure plate and said aperture plate, to transfer said film from said transport system to said pilot pin means by said pressure plate, for seating said film on said aperture plate, and means for tilting said pressure plate with respect to said aperture plate during said lifting of said arm, said pressure plate in said tilted position rocking down over said film in said seated position on the aperture plate.

3,914,036

FILM FRAME FEED DEVICE IN A COMPACT MOTION PICTURE PROJECTOR

Shigeo Wakahara, Yokohama, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed June 13, 1974, Ser. No. 479,110
Claims priority, application Japan, June 20, 1973, 48-73354
Int. Cl.² G03B 1/22
U.S. Cl. 352—194 4 Claims



1. A film frame feed device for a compact motion picture projector, comprising:

a film feed pawl;

film feed pawl drive means for imparting a rectangular movement to said film feed pawl so as to cause said pawl to feed a film intermittently;

an operating member;

change-over means operable by said operating member to change over the film feed speed of said drive means between a first condition under which said film feed pawl feeds the film at a predetermined rate, a second condition under which said film feed pawl feeds the film at a rate equal to said first-named cycle multiplied by an integer, and a third condition under which said film feed pawl is disabled to effect film feed;

means for restraining said change-over means in each of said three conditions;

means associated with said change-over means for rendering same capable of changing over said film feed pawl drive means to a fourth condition discrete from said second condi-

tion but under which said film feed pawl feeds the film at the same rate as that in said second condition; and

means biasing said change-over means from said fourth condition to said third condition;

whereby said change-over means may be automatically changed over from said fourth condition to said third condition.

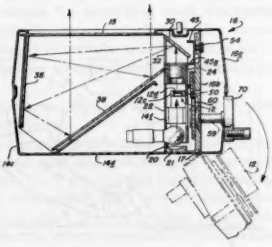
3,914,037
LAP MODEL MICROFILM VIEWER

Arnis E. Peters, La Crosse, Wis., assignor to Gelatt Investments, Inc., La Crosse, Wis.

Continuation-in-part of Ser. No. 175,123, Aug. 26, 1971, Pat. No. 3,785,728, which is a continuation-in-part of Ser. No. 90,514, Nov. 18, 1970, Pat. No. 3,700,321. This application Dec. 12, 1973, Ser. No. 423,932

Int. Cl.² G03B *21/11, 21/28, 23/12*

U.S. Cl. 353—26 **5 Claims**



1. In a microphotograph viewer provided with means for selection, illumination, enlarging projection, reflection, and display upon a viewing screen of an enlargement of a microphotograph that is provided on a film strip carried within a cassette in which the film strip is arranged to move through the cassette's bight; the improvement of a lap-model size viewer comprising, in combination: an elongated casing providing walls surrounding a reflection chamber in which is effected enlarging projection and reflection of an illuminated microphotograph that is to be seen upon a viewing screen located in one of the longitudinal walls of the casing, said reflection chamber also being bounded by a support wall that extends transverse to the elongated casing and is spaced longitudinally from the ends of the casing's longitudinal walls that are distal from the reflection chamber to provide an exposable casing end recess in which are positioned illumination means and lens means having spaced apart portions to accommodate entry of the bight portion of a film carrying cassette therebetween; an end construction hinged to said terminal end of one of the longitudinal walls of the casing to swing between a closed position in which the viewer may be operated and an open position in which the illumination means and lens means are exposed for ready access thereto, said end construction providing means for selective mounting thereon of a bighted film cassette so that when the end construction is in closed position the cassette's bight is positioned between the spaced apart portions of the lens means in the end recess of the casing, and drive means on the end construction including a control handle extending outwardly of the end construction for selectively moving the cassette's film strip through the cassette's bight.

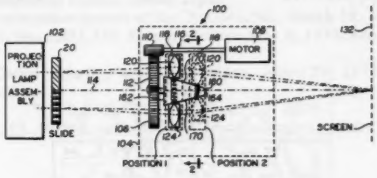
3,914,038
METHOD AND APPARATUS FOR PROVIDING A STATIONARY FILM RECORD HAVING SEQUENTIALLY DISPLAYABLE IMAGES

Stephen A. Liguori, 100 Ellsworth Terrace, Glen Rock, N.J. 07452

Division of Ser. No. 356,970, May 3, 1973, Pat. No. 3,858,974. This application July 15, 1974, Ser. No. 488,745

Int. Cl.² G03B *23/00, 21/14*

U.S. Cl. 353—89 **17 Claims**



1. An attachment for a stationary film record projection means capable of sequentially displaying a plurality of sequential images stored on said stationary film record in contiguous substantially equisize image display areas which are all contained within a single frame area of said film record which is divisible into said image display areas and has an associated initial optical center for purposes of said display, with each of said image display areas having a different distinct associated initial optical center for purposes of said display which are each equidistant from said frame area initial optical center, said sequentially displayable images each having substantially the same orientation with respect to each other and said frame area optical center; said attachment comprising a projection lens array having a plurality of projection lenses, each of said projection lenses of said plurality being aligned with a different corresponding image display area, said plurality of lenses being equal in number to said plurality of image display areas, each of said lenses being capable of projecting a image from said associated image display area; a controllably rotatable shutter means interposable between said lens array and said film record, said shutter means having an aperture therein substantially equal in size to one of said image display areas and being selectively registerable therewith, said shutter means further being capable of interposing an opaque mask between said lens array and said other image display areas for selectively preventing the display of said image display areas other than the one with which said aperture is selectively registerable; and means for controllably rotating said shutter means for sequentially selectively varying the image display area with which said aperture is registerable so as to provide said sequential display of said images from said stationary record; said lens array further comprising means for simultaneously varying the magnification of said plurality of lenses and maintaining the registration of each of the plurality of selectively displayable images with respect to a display surface for said selected single image, said lens array having a longitudinal axis, with said magnification being varied by movement of said lens array with respect to said stationary film record frame along said longitudinal axis, said longitudinal axis being substantially normal to said frame area optical center, said magnification varying and registration maintaining means comprising means for substantially equally biasing said lenses in a direction relative to said longitudinal axis with a predetermined biasing force, said lenses being arranged about said longitudinal axis along optical axes associated therewith which are substantially parallel to said longitudinal axis, said lens optical axis substantially intersecting the image display area optical center of the corresponding image display area at a predetermined position of magnification for the corresponding lens and being maintainable in at least said position and variable therefrom to vary said magnification to another maintainable position thereof, whereby a plurality of sequential

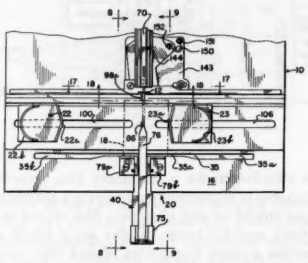
images may sequentially be displayed from said film record frame in a stationary position thereof.

3,914,039

SLIDE CHANGING MECHANISM

Frank P. Bennett, Franklin Lakes, N.J., and Walter J. Hall, Evanston, Ill., assignors to GAF Corporation, New York, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,824
Int. Cl.² G03B *23/14*
U.S. Cl. 353—114 **27 Claims**



1. In a slide changing mechanism of the type having a reciprocally mounted slide changer for advancing slides one at a time from a stack of such slides to a gate and for returning each slide to the stack, the improvement comprising:

a. means cooperating with said slide changer for advancing a first slide in a plane containing said slide from said stack to said gate during corresponding movement of said slide changer; and

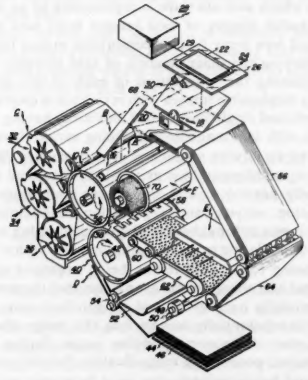
b. other means cooperating with said first mentioned means for shifting at least a portion of the latter transversely of the path of travel of said slide changer and thereby permitting return movement of said first slide in said plane.

3,914,040

REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING

James H. McVeigh, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed June 3, 1974, Ser. No. 475,731
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **20 Claims**



11. An electrophotographic printing machine of the type having a device for charging a photoconductive surface to a substantially uniform potential and an exposure mechanism for creating a light image of an original document arranged to be recorded on the photoconductive surface, wherein the improvement includes:

a support member mounted on the printing machine, said support member being arranged to hold the original document in a light receiving relationship with the exposure mechanism; and

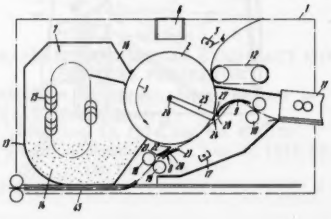
a plate member interposed between said support member and the original document so that the light image thereof passes through said plate member, said plate member comprising a substantially transparent portion and a screen portion mounted on one surface of the transparent portion.

3,914,041

COPY SHEET GUIDANCE DEVICE FOR PHOTO-COPYING MACHINES

Egon Opravil, Brackel, Germany, assignor to Lumoprint Sindler KG, Hamburg, Germany

Filed Nov. 30, 1973, Ser. No. 420,580
Claims priority, application Germany, Dec. 1, 1972, 2258792
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **20 Claims**

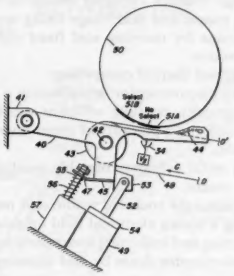


1. A copying machine including a cylinder mounted for rotation about its central axis and having a continuous circumferentially extending photo-conductive surface spaced radially outward from its central axis onto which surface an optical image can be transferred, a copy sheet guiding device arranged for supporting and carrying the leading edge of a copy sheet as the copy sheet moves in an arcuate path in contact with said cylinder from a first position where it moves into contact with the photo-conductive surface of said cylinder to a second position where it moves out of contact with the photo-conductive surface, said device comprising mechanical guidance means arranged to be movably displaced from the first position to the second position concentrically with respect to the central axis of said cylinder, said mechanical guidance means includes a support member for the leading edge of the copy sheet located adjacent to and spaced outwardly from the circumferential peripheral surface of said cylinder, stop means positioned adjacent to and radially outwardly from the circumferential periphery of said cylinder at the second position where the copy sheet is removed from said cylinder, and transport means for moving a copy sheet and said guidance means from the first position to the second position, said support member of said guidance means being engageable in the first position by the leading end of a copy sheet and being movable by the leading edge of the copy sheet via said transport means for displacing said guidance means to the second position in which said support member strikes said stop means, whereupon the leading edge of the copy sheet is deflected outwardly from said support member and is driven from said cylinder.

3,914,042
TONER IMAGE TRANSFER APPARATUS

Donald W. Watson, Arlington Heights, Ill., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 27, 1972, Ser. No. 221,230
Int. Cl.² G03G *15/16*
U.S. Cl. 355—3 R **13 Claims**



1. In electrophotographic apparatus including a photoreceptor, means for forming electrostatic images on said photoreceptor and means for providing each electrostatic image formed at a transfer station where selective transfer of said electrostatic images to transfer member means may occur, the improvement in said electrophotographic apparatus comprising:

ion charging means disposed at a location opposite to said transfer station;

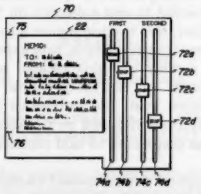
means for feeding transfer member means intermediate said photoreceptor and said ion charging means; and

means for selectively placing said transfer member means in a transfer relationship with said photoreceptor within a time interval which is less than that required by said ion charging means, when energized, to cause ionization of a gap between said photoreceptor and said transfer member means being placed in a transfer relationship therewith.

3,914,043
COLOR ACCENTING COPYING MACHINE

James H. McVeigh, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 29, 1974, Ser. No. 456,090
Int. Cl.² G03G *15/01*
U.S. Cl. 355—4 **6 Claims**



1. An apparatus for forming at least a two color copy from a single color original document, including:

a support member arranged to hold the original document thereon;

means for adjustably indicating a portion of the original document to be copied in a first color and a portion of the original document to be copied in a second color;

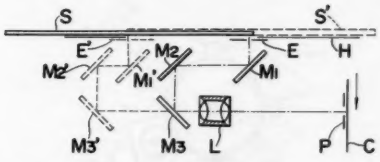
circuit means coupled to said indicating means for producing a signal defining the portions of the original document to be copied in the first color and the second color; and

means, responsive to the signal from said circuit means, for reproducing the original document with the portions of the copy corresponding to the indicated portions of the original document being formed in the first and second colors.

3,914,044
SURFACE EXPOSURE DEVICE FOR COPYING APPARATUS

Masaya Ogawa, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 341,782, March 15, 1973, Pat. No. 3,825,339. This application May 6, 1974, Ser. No. 467,570
Claims priority, application Japan, Mar. 29, 1972, 47-31389
Int. Cl.² G03B *27/48, 27/50, 27/70*
U.S. Cl. 355—8 **8 Claims**



1. A device for the optical exposure of an original on copying material which is movably arranged, comprising a housing structure; a support surface horizontally slidably provided in one housing wall and made of transparent material, the original being adapted to be placed on said support surface; an exposure plate provided in the housing structure spaced from the support surface and over which the copying material is moved; exposure means arranged between the support surface and the exposure plate and including a lens assembly arranged in the housing structure to transmit rays of light carrying an image of the original towards the copying material through the exposure plate, said lens assembly being axially shiftable between initial and shifted positions, said lens assembly when in said initial position forming the image of the original on the copying material at a first copying ratio and said lens assembly when in said shifted position forming the image of the original on the copying material at a second copying ratio; a reflector arrangement located between the lens assembly and the support surface and including a plurality of mirrors divided into first and second groups, the two groups being displaceable in the same direction, parallel to the path of travel of said rays of light between said two groups, the first group being movable reciprocally in the direction opposed to the direction of travel of the support surface at the same speed as said support surface, and the second group being movable at half the speed of the first group; guide means arranged in the housing for guiding the two groups of mirrors for movement parallel to the direction of travel of the support surface; first and second control means connected to the first and second groups of mirrors and the support surface and operable, upon movement of the mirrors, to modify a first ray path between one mirror of the first mirror group and at least one mirror of the second mirror group in a relative manner with respect to the modification of a second ray path between at least one mirror of the second mirror group and said lens assembly, whereby an image ray extending between the support surface and said lens assembly, produced on exposure of the original, always follows a path of constant length, regardless of the position of a mirror with respect to the original, said first control means also operable, upon said movement of the mirrors, to move the support surface in the opposite direction to the direction of travel of any of said first and second mirror groups, said second control means further operable to vary the initial position of said second mirror group to a shifted position

axially spaced from its initial position in a direction away from any one of the first mirror group and said lens assembly, said variation of said second mirror group to said shifted position being effected when said lens assembly is moved to said shifted position forming the image of the original on the copying material at the second copying ratio.

3,914,045

METHOD AND APPARATUS FOR REMOVING RESIDUAL IMAGE FROM PHOTOCONDUCTIVE ELEMENT OF ELECTROPHOTOGRAPHIC COPYING MACHINE

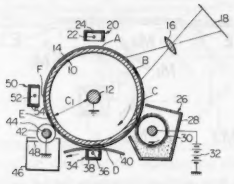
Ryoichi Namiki; Kazunori Matsuo, and Mutsuo Watanabe, all of Tokyo, Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Apr. 24, 1974, Ser. No. 463,634

Claims priority, application Japan, Apr. 30, 1973, 48-48949

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **15 Claims**



1. An apparatus for removing a residual image from a photoconductive member of an electrophotographic copying machine after the photoconductive member has been utilized in the steps of sequentially charging, imaging, developing and transferring, the apparatus comprising:

a grounded member to partially remove the residual image from the photoconductive member through physical contact therewith;

a charged member to remove the remainder of the residual image from the photoconductive member through physical contact therewith, and

a source of electromotive force to discharge the photoconductive member after performing the transferring step,

said photoconductive member being a roller, and in which the grounded member is disposed between the source and the charged member in the direction of rotation of the photoconductive member.

3,914,046

ELECTROPHOTOGRAPHIC COPYING APPARATUS

Susumu Tanaka, Sakai; Yuji Enoguchi, Higashi Osaka, and Hidetoshi Kawabata, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed July 1, 1974, Ser. No. 484,889

Claims priority, application Japan, July 27, 1973, 48-85259; July 30, 1973, 48-86234

Int. Cl.² G03G *21/00*

U.S. Cl. 355—15 **9 Claims**

1. In an electrophotographic copying apparatus of the toner powder image type which has:

feeding means for feeding copy paper into the apparatus,

a horizontally reciprocating transparent platform on which the document to be copied is placed,

exposure lamp means for illuminating the document on said transparent platform,

a rotatable photoreceptor drum for contacting the paper supplied by said feeding means, said photoreceptor drum located under said transparent platform and rotatable relative to a plurality of processing means which are actuated in a timed relation to the rotation of the drum, said processing means including drum surface charging means, developing means, image transfer charging means, erasing means, and cleaning means,

paper discharging means adjacent said image transfer charging means, for discharging the paper after the image has been transferred thereto,

fixing means for fixing a toner powder image onto said copy paper,

suction paper transfer means for conveying paper from said image transfer charging means to said paper discharging means and said image fixing means, and

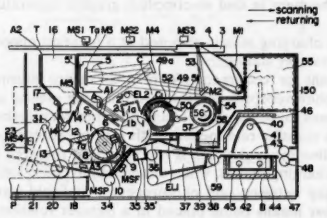
carrying means for carrying said fixed copy paper out of said apparatus,

an improvement thereof comprising:

an improved photoreceptor drum having a diameter which makes optically possible efficient electrophotographic copying utilizing a plurality of drum revolutions for each copy cycle;

a rotatable metal cylinder rotatably position adjacent said cleaning means;

a corona discharger enclosed within said metal cylinder for producing a strong electrical field on said metal cylinder for attracting and collecting toner particles removed from said photoreceptor drum by said cleaning means;



suction means adjacent said metal cylinder for attracting any remaining toner particles removed from the surface of said photoreceptor drum by said cleaning means which are not attracted to and collected on the surface of said metal cylinder, said suction means also connected to said suction paper transfer means, said exposure lamp means, said drum surface charging means, said image transfer charging means, and said fixing means, whereby scattered toner particles, heat, and poisonous gases produced in these means are withdrawn by the suction means;

filtering means connected to said suction means comprised of:

a first filter section ducted to said cleaning means and said metal cylinder and having mesh openings facing said fixing means and said exposure lamp means;

a replaceable filter medium in said first filter section;

a second filtering section joined to said first filtering section and said suction means to permit the flow of gases therethrough;

mesh screens between said second filtering section and said suction means treated by a catalyst effective for reducing ozone; and

a granular carbon filtering medium in said second filtering section for purifying the gases passing therethrough.

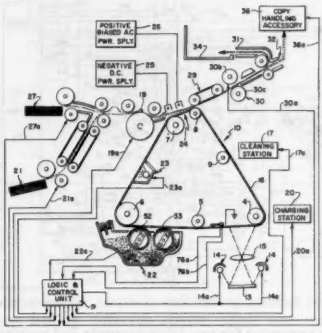
3,914,047
SYNCHRONIZING CONTROL APPARATUS FOR ELECTROPHOTOGRAPHIC APPARATUS UTILIZING DIGITAL COMPUTER

William E. Hunt, Jr.; John L. Connin, and Douglas J. Steelman, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 402,223, Oct. 1, 1973, abandoned. This application June 20, 1974, Ser. No. 481,436

Int. Cl.² G03G *15/00*

U.S. Cl. 355—16 **16 Claims**



1. In electrophotographic apparatus having actuable work stations and adapted to utilize an electrophotosensitive web member defining a plurality of selectable image areas and having indicia in a predetermined relationship with respect to the locations of such image areas, said web member being movable along an endless path past a plurality of actuable work stations located along the endless path, said work stations being operative when actuated to perform work operations on selected image areas of the web member, respectively, the improvement comprising:

a. means disposed at a fixed location along the path and responsive to such indicia to produce signals representative thereof; and

b. logic control means having a digital computer with a stored program and responsive to such signals for actuating said work stations in timed relation to movement of the web member past said fixed location in accordance with the stored program to effect sequential operation of such actuated work stations with respect to selected image areas during movement of the member along the endless path, respectively.

3,914,048
GRAPHIC PRINTER

Daniel H. Robbins, 35 Schoolhouse Lane, Rochester, N.Y. 14618

Filed July 29, 1965, Ser. No. 475,638

Int. Cl.² G03B *21/00, 27/32*

U.S. Cl. 355—66 **5 Claims**

1. A photographic printing system comprising:

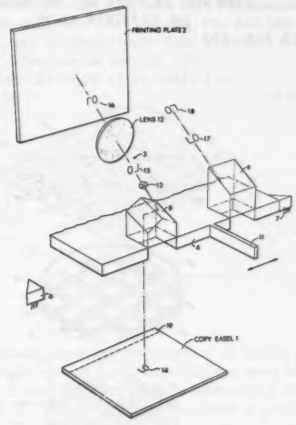
a. a copy easel for supporting indicia thereon;

b. a printing plate for printing an image of said indicia;

c. an optical system having a first and second state for presenting images of said indicia perverted an odd number of times to said printing plate when said optical system is in said first state and for presenting images of said indicia perverted an even number of times to said printing plate when said optical system is in said second state; and

d. control means for selectively causing said optical system to assume said first state or in the alternative to assume said second state;

said optical system including a first set of reflecting surfaces having an odd number of reflecting surfaces and a second set of reflecting surfaces having an even number of reflecting surfaces, the reflectance of at least one of the



individual reflective surfaces of said first set of reflecting surfaces being less than the reflectance of at least one of the individual reflective surfaces of said second set so that the composite reflectances of each set are balanced.

3,914,049
OPTICAL SCANNING SYSTEM

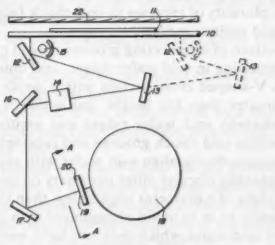
Samir K. Basu, Stevenage, and Roger D. Masham, Biggleswade, both of England, assignors to Xerox Corporation, Stamford, Conn.

Filed May 20, 1974, Ser. No. 471,521

Claims priority, application United Kingdom, May 23, 1973, 24564/73

Int. Cl.² G03B *7/08*

U.S. Cl. 355—68 **4 Claims**



1. An optical system for projecting an image of an object to be copied including:

object illuminating means to illuminate said object at an object surface,

means to project an image of said object along an optical path to an image surface,

a light intensity detector disposed adjacent to said optical path and in optical communication with said object,

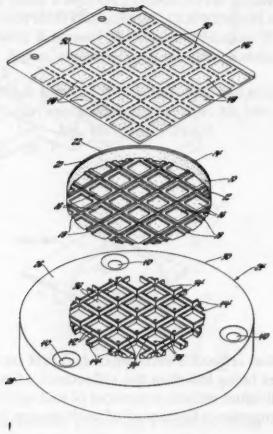
a cover disposable over said object, on the side thereof opposite said illuminating means and said light intensity detector, and configured to reflect light from said illuminating means in direction other than toward said light intensity detector.

3,914,050

POSITIVE SELECTIVE NICKEL ALIGNMENT SYSTEM

Richard W. Dost; James L. Hudson, and Larry L. Jordan, all of Kokomo, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed May 24, 1973, Ser. No. 363,488
Int. Cl.² G03B 41/00
U.S. Cl. 355—133 1 Claim



1. Apparatus for automatically aligning a semiconductor wafer back side photomask that is complementary to and in precise registration with a plurality of emitter mesas on the front side of the wafer, said apparatus comprising:

an alignment chuck having a face for receiving the front side of a circular semiconductor wafer having a plurality of emitter mesas on its front side and a grid pattern of intersecting ridges between and spaced from the emitter mesas;

a pattern of intersecting ridges on said chuck face corresponding to said grid pattern on said wafer and forming a plurality of recesses in said chuck face corresponding to said emitter mesas;

a pattern of intersecting grooves in said chuck ridges corresponding to said wafer ridges, said chuck grooves having a V-shaped cross section with a depth and width slightly greater than the height and width of the wafer ridges, whereby said wafer ridges and emitter mesas can nest within said chuck grooves and recesses, respectively, and automatically align said wafer with said chuck;

a generally circular outer periphery on said pattern of chuck ridges of a diameter slightly less than the diameter of said wafer so as to avoid engagement with peripheral portions of said wafer which may not have well-defined ridges;

a support that is movable into and out of a predetermined position that is adjacent said chuck;

means for automatically guiding said movable support into said predetermined position adjacent said chuck;

a wafer back side photomask that is complementary to said wafer front side;

means fixing said photomask to said movable support whereby movement of said support into said predetermined position moves said photomask into contact with the back side of a wafer whose front side is nested in said chuck grooves and recesses; and

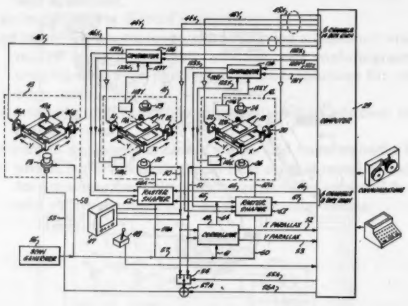
said photomask precisely aligned with said chuck grooves when said support is in said predetermined position, and thereby automatically precisely aligned with a wafer front side nested in said chuck grooves and recesses.

3,914,051

AUTOMATIC ORTHOPHOTO PRINTER AND DISPLAY INCLUDING POSITION ERROR COMPENSATION FOR PHOTO-POSITIONING TRANSPORT

Barry G. Crawley, North Burnaby, Canada, assignor to Hobrough Limited, Vancouver, Canada

Filed Dec. 17, 1973, Ser. No. 425,541
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G01C 11/18
U.S. Cl. 356—2 10 Claims



6. An apparatus for providing accurate and precise scanning of an object, comprising:

a. scanning means including means establishing a scan pattern;

b. frame means relatively aligned with said scanning means for holding the object;

c. means providing a first signal establishing a desired position of said object relative to the scan pattern of said scanning means;

d. drive means coupled to said frame means for moving said object in response to said first signal;

e. sensor means providing a second signal proportional to the actual position of said object relative to said scan pattern;

f. comparator means for subtractively combining said first and said second signals to obtain a position error signal; and,

g. means coupled to said comparator and to said scanning means for shifting the scan pattern of said scanning means in proportion to said position error signal.

3,914,052

APPARATUS FOR USE IN EQUIPMENT WHICH MEASURES PHYSICAL QUANTITIES BY SENSING PHASED DELAYS IN ELECTROMAGNETIC RADIATION

Klas Rudolf Wiklund, Taby, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Nov. 14, 1973, Ser. No. 415,797
Claims priority, application Sweden, Nov. 15, 1972, 14798/72
Int. Cl.² G01C 3/08; G01S 9/04, 9/23
U.S. Cl. 356—5 2 Claims

1. In a measuring apparatus in which an electromagnetic wave being modulated at a predetermined frequency and having a predetermined phase is transmitted along a measuring path to be returned as a reflected wave onto a receiver therein, the combination including

means for defining a reference path;

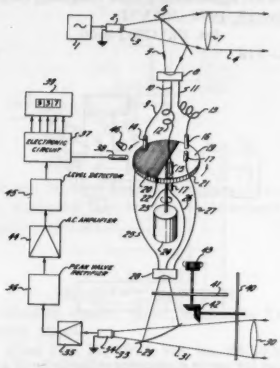
means for diverting a portion of said electro-magnetic wave along said reference path to provide a reference wave;

means intersecting said reference path for phase modulating said reference wave at a frequency low compared to said predetermined frequency to provide a phase modulated wave;

means for combining said reflected wave with said phase modulated wave to provide a combined wave; and

means responsive to said combined wave for indicating the length of said measuring path; said indicating means also being responsive to said phase modulating means;

said phase modulating means including:



a disk mounted for rotation and having at least two fields thereon having different effects upon said measuring wave; and

first, second and third reference paths having guiding means for guiding portions of said reference wave along said reference path and each interacting with a different portion of said disk; said first, second and third reference paths having guiding means being of different length.

3,914,053

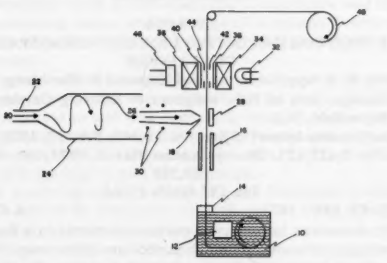
ICE NUCLEI COUNTER

Carl H. Morley, Ridgecrest, and Lohr A. Burkardt, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 9, 1974, Ser. No. 530,914

Int. Cl.² G01N *1/00*

U.S. Cl. 356—37 **1 Claim**



1. An appartus for counting ice nuclei, comprising;

an air inlet port for providing a flow of ice nuclei within a preselected range of sizes;

water wetted film;

means to supercool the wetted film;

means for moving said film past said port such that said film is in the path of said flow of ice nuclei; and

means for interrogating said film subsequent to its movement past said port to measure the number of ice crystals present in said flow, in which, each ice crystals has a very high probability of representing a single ice nuclei.

3,914,054

ZEEMAN EFFECT ABSORPTION SPECTROMETER

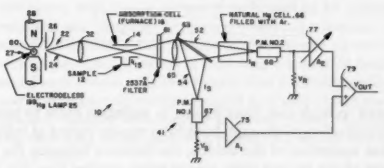
Tetsuo Hadeishi, Berkley, Calif., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 288,801, Sept. 13, 1972, abandoned. This application Feb. 13, 1974, Ser. No. 442,280

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G01N *21/34*; G01J *3/30*

U.S. Cl. 356—51 **10 Claims**



1. The method of detecting the presence of mercury in a host food material, such as fish, comprising the steps of:

a. vaporizing a sample of the fish in an open-ended furnace at at least 150°C after having circulated a gas therethrough to decrease smoke;

b. producing specific focused light spectra from a single specific ^{199}Hg isotope in a single separate electrodeless light source means in the presence of a magnetic field of up to 10 kG whose direction is normal to the spectra and whose strength is sufficiently strong so that said spectra comprise ultra violet light having a wavelength of 2,537 A and specific σ^+, σ^- and π circularly and linearly polarized Zeeman components, a first of said components having a intensity that is capable of being attenuated by absorption by said mercury in said vapor, said first of said Zeeman components being on the top of the absorption peak profile of the mercury and the remaining of said Zeeman components being non-absorbed by said mercury in said vapor thereby forming at least one reference signal;

c. transmitting said light spectra through said vapor in said open-ended furnace wherein the aforesaid first component is attenuated and the other components are substantially non-absorbed by said mercury;

d. splitting said spectra emerging from said vapor into first and second beams;

e. producing a first electrical signal output corresponding to the intensity of said first beam;

f. subjecting said second beam to absorption by a filter that removes the aforesaid first component attenuated by the mercury in the vapor;

g. producing a second electrical signal output corresponding to the intensity of the filtered second beam; and

h. measuring the difference between the first and second electrical signal outputs as an indication of the amount of mercury present in said sample of said fish.

3,914,055

INSTRUMENT FOR HIGH RESOLUTION SPECTRAL ANALYSIS WITH LARGE OPTICAL THROUGHPUT

George J. Wolga, and Ross A. McFarlane, both of Ithaca, N.Y., assignors to Lansing Research Corporation, Ithaca, N.Y.

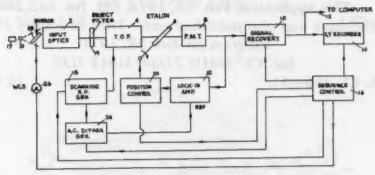
Filed May 23, 1974, Ser. No. 472,910

Int. Cl.² G01J *3/44*; G01B *9/02*

U.S. Cl. 356—75 **11 Claims**

1. A spectral analysis device comprising first and second filter means, the first filter means having a single passband and the second filter means having a plurality of spaced passbands, the width of each of which is substantially narrower than the passband of the first filter means, the second filter means

being positioned to receive the output of rays from the first filter means, means to register the output from the second filter means, means to tune the first filter means to vary the frequency of light passing there through, and means connected to both said filter means to maintain them to pass the same wavelength through both filter means during at least part of the operation of the device, the distance between the passbands of the second filter means being greater than the width of the passband of the first filter means.



3,914,056
APPARATUS FOR EVALUATING HOLOGRAPHICALLY RECONSTRUCTED WAVE FIELDS WITH TWO FREQUENCIES

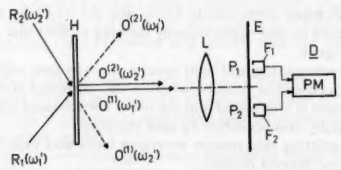
Francois M. Mottier, and Rene Dandliker, both of Oberrohrdorf, Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jan. 21, 1974, Ser. No. 435,215

Claims priority, application Switzerland, Feb. 14, 1973, 2010/73

Int. Cl.² G01B 9/02

U.S. Cl. 356—109 **6 Claims**



1. Apparatus for evaluating the reconstruction of holographically recorded wave fields produced by the scattering of a collinear illuminating beam of two optical frequencies ω_1 and ω_2 at a test object and holographically recorded by means of two reference waves of the frequencies ω_1 and ω_2 respectively, wherein $\omega_1 - \omega_2 > 1$ GH2., which comprises:

means for providing during recording at said hologram two spatially separate reference waves inclined to said wave field scattered at said object and impinging on a holographic recording medium, wherein the reference waves for reconstructing said wave fields are oriented with respect to said recording medium identically to their spatial orientation during said recording process and are of frequencies ω_1 and ω_2, respectively, and wherein the difference between ω_1 and ω_2 is between zero and 1 GHz.;

geometric-optical means for focusing the reconstructed wave fields in an image plane; and

optoelectronic detector means for scanning said image plane to evaluate the fluctuating light signal and its phase in said image plane.

3,914,057
APPARATUS FOR MEASURING REFLECTIVITY

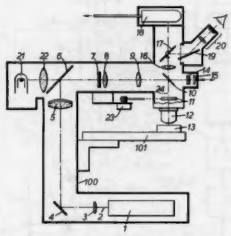
Francis Hughes Smith, and Derek Stanley Moore, both of York, England, assignors to Vickers Limited, London, England

Filed Oct. 16, 1974, Ser. No. 515,314

Claims priority, application United Kingdom, Oct. 17, 1973, 48454/73; Jan. 25, 1974, 3683/74

Int. Cl.² G01J 4/00

U.S. Cl. 356—118 **13 Claims**



1. Apparatus for use in measuring reflectivity of a specimen, said apparatus comprising:

a support structure defining a specimen location, for a specimen under examination;

illumination means mounted for providing an intense beam of linearly polarised light directed towards said specimen, at said specimen location, to be reflected thereby;

a photodetector mounted for receiving reflected light of the said beam, having undergone reflection at said specimen and providing an output signal dependent upon the intensity of the received light;

and selectively controllable polarisation-changing means mounted at a position optically between said specimen location on the one hand and, on the other hand, both said illumination means and said photodetector, for imposing controlled rotation of the direction of polarisation upon said beam directed towards said specimen, whilst imposing equal but opposite rotation, of the direction of polarisation, on said light reflected from said specimen, when no change in the direction of polarisation of said light is produced by the said reflection itself.

3,914,058
METHOD FOR INSPECTING LIQUIDS IN TRANSPARENT CONTAINERS

Julius Z. Knapp, Somerset, and Emanuel B. Hershberg, West Orange, both of N.J., assignors to Schering Corporation, Bloomfield, N.J.

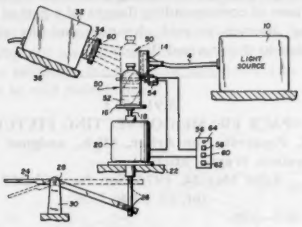
Continuation-in-part of Ser. No. 12,342, Feb. 17, 1970, Pat. No. 3,627,423. This application Mar. 3, 1971, Ser. No. 120,399

Int. Cl.² G01N 21/24

U.S. Cl. 356—197 **6 Claims**

1. A method for detecting particulate matter in a liquid in a transparent container which particulate matter may include first particles which will move in the liquid when the liquid is rotated at a first rate and can be easily detected when the liquid is rotating at said first rate, and second particles which will move in the liquid when the liquid is rotated at a second rate different from said first rate and can be easily detected when said liquid is moving at said second rate, said first particles being difficult to detect when the liquid is rotating at said second rate and said second particles being difficult to detect when the liquid is rotating at said first rate, comprising the steps of rotating the container to bring the liquid to at least both said first and second rates of rotation, rapidly stopping the rotation of the container after the liquid has reached each of its said first and second rates of rotation, and immediately

inspecting the rotating liquid after each said stopping, said first rate of rotation of said liquid being lower than the said



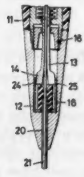
second rate and the said liquid being brought to its first rate of rotation, inspected, then brought to its second rate of rotation and again inspected.

3,914,059

MECHANICAL PENCIL

Yoshihide Mitsuya, Osaka, Japan, assignor to Yoshihide Mitsuya, Osaka, Japan

Filed Feb. 28, 1974, Ser. No. 447,036
Int. Cl.[2] B43K *21/16*
U.S. Cl. 401—67 **5 Claims**



1. An automatic lead pencil having a pencil body with a terminal tubular end portion at the forward end of said pencil body when said pencil is pointed downward and wherein said lead can be made to extend from and retract into said end portion comprising:

lead containing means within said pencil body for containing lead used in said pencil;

expandable chuck means connected to and below said lead containing means when said pencil is pointed downward for clutching lead coming from said lead containing means;

actuating means extending above said pencil body when said terminal end is pointed downward and operatively connected to said lead containing means for forcing said lead containing means downward, thereby actuating said chuck means, causing said chuck means to expand and allow the lead to pass therethrough;

lead protecting means surrounding and frictionally holding the lead as the lead passes through and out of the terminal end of said pencil, said lead protecting means movably mounted within said terminal end extendable therefrom and retractable thereinto with the extension and retraction of the lead into and out of said pencil body;

two springs within said pencil body positioned for biasing said lead containing means upward when said pencil is pointed downward, one of said springs being of lesser biasing strength than the other and positioned for being actuated by said actuating means before said stronger spring of the two is actuated, whereby depressing said actuating means with sufficient force to depress and actuate only the weaker of said two springs will cause said chuck means to advance to a first position below said lead containing means while clutching said lead, then advance further, expand and release said lead, thereby moving said lead downward a predetermined length from said lead containing means into and through said lead protecting means and out of said pencil, and whereby releasing said actuating means will cause said spring to expand, drawing said lead containing means and said chuck means upward, thereby causing said chuck means to close and grasp said lead once again;

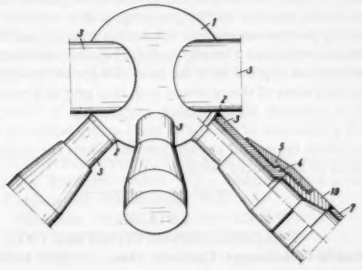
slidable retracting means elevatably and freely fitted within said terminal end for holding said lead protecting means and for engaging with said chuck means when said chuck means is fully extended and expanded, whereby depressing said actuating means with sufficient force to first compress the weaker spring and then the stronger spring will cause said chuck means to fully extend to a second position and engage with said retracting means and whereby releasing said actuating means will cause said springs to expand, drawing said lead containing means, said chuck means attached to said lead containing means, and said retracting means engaged with said chuck means upward, thereby withdrawing said lead protecting means and said lead within said lead protecting means into said pencil body.

3,914,060

CONNECTING STRUCTURE FOR FRAMES, SCAFFOLDS, LATTICE STRUCTURE OR THE LIKE

Hermann Miller, Krefeld, and Ernst Kühn, Dusseldorf, Germany, assignors to Mannesmann-Rohrenwerke AG, Dusseldorf, Germany

Filed Dec. 5, 1973, Ser. No. 421,866
Claims priority, application Germany, Dec. 7, 1972, 2260417
Int. Cl.[2] F16B *7/00*
U.S. Cl. 403—171 **2 Claims**



1. Joint and connecting structure for section elements in a frame, scaffold or lattice arrangement or the like, wherein section elements with plane axial end faces converge from different directions towards the structure, comprising:

a support element having studs extending in the different directions from the support element, and having a radially outwardly extending flange at their respective outer end with a plane, axial end face;

a plurality of sleeves each with threading at one end and having an overhung ridge or collar, and being rotatably seated respectively on the studs, so that the ridge of a sleeve of the plurality extends behind the flange of the respective stud preventing removal of the sleeves from the studs, each sleeve being axially retained on the respective stud by the flange of the stud and by said support element from which the stud extends, the spacing between said flange and said support element being sufficient to retract the sleeve, so that its threaded front end clears said end face of the flange; and

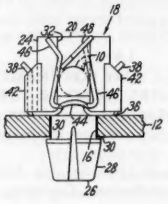
a threaded end piece of a section being welded to the section proper, the end piece having a cylindrical portion of the same outer diameter as the section element, the

sleeve having for at least a portion of its axial extension also the same outer diameter, the threaded end piece of the section having a reduced diameter for threaded insertion into the threaded portion of the respective sleeve, the threading of each sleeve adapted for secure connection with the said end piece of the section element, so that an end face of the end piece abuts said end face of the respective flange in a common plane, said flange and said section clear said common plane for lateral placement of said section without axial displacement upon unthreading of the sleeve from the section or prior to threading onto the section.

3,914,061
ROD RETAINING CLIP

Engelbert A. Meyer, Union Lake, Mich., assignor to USM Corporation, Boston, Mass.

Filed May 30, 1974, Ser. No. 474,304
Int. Cl.² F16B *9/00*; **F16L** *41/00*
U.S. Cl. 403—197 **6 Claims**

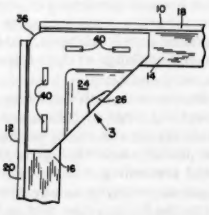


1. A clip for securing an angular end portion of a rod in a receiving opening of a lever or the like, the clip comprising an axially slotted socket portion adapted to receive the rod end and to be secured in the opening, and a radially extending locking portion secured to the socket portion and having rod gripping means at a locally radially beyond said slotted socket portion and aligned with the axial slot for releasably engaging opposite sides of the received rod, said gripping means including a yieldable locking latch engageable in closed position with a third side of the rod at said locality positively to bar rod retraction from said slotted portion when the angular end is seated in the socket portion.

3,914,062
WELDED CORNER CONSTRUCTION

Richard T. Heininger, Gardner, Mass., assignor to Gem Industries, Inc., Gardner, Mass.

Filed July 30, 1974, Ser. No. 493,176
Int. Cl.² B25G *3/00*
U.S. Cl. 403—231 **5 Claims**



1. Corner construction for an open frame utilizing angle irons for the sides and ends thereof,

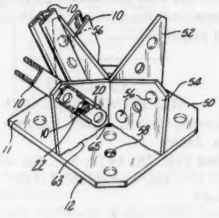
said corner construction comprising a pair of plates welded in part flatwise together, said plates being in the form of triangles,

spaced portions on said plates at intersecting edges thereof in unwelded areas of said plates, said spaced portions forming a pair of intersecting channels, the terminal end portions of corresponding flanges of a pair of angle irons being inserted in said channels and the plates being welded to the inserted flanges.

3,914,063
SPACE FRAME CONNECTING FIXTURE

Hristo V. Papayoti, Ann Arbor, Mich., assignor to Unistrut Corporation, Wayne, Mich.

Filed May 24, 1973, Ser. No. 363,369
Int. Cl. E04c *3/08*
U.S. Cl. 403—406 **4 Claims**



1. A connector fixture for use in a strut type space frame in which there are included a plurality of substantially horizontal chord struts and a plurality of web struts oriented in angular directions, said fixtures comprising a flat, substantially horizontal chord strut attachment base plate and a pair of upstanding, substantially right angularly disposed web strut attachment plates connected to said base plate, said pair of plates having respective cut-out portions proximate their center portions and mutually engageable one with the other, said pair of plates having formed at their lower edge a plurality of downwardly extending tab portions, said base plate further having a like plurality of apertures juxtaposed to said tab portions for receiving and holding the same in properly aligned position, and means for bonding said plates one to the other, said base plate and said pair of web strut attachment plates each having linearly arranged pairs of lugs and openings on the surfaces thereof, the lines through the centers of said linearly arranged pairs of lugs and openings intersecting at a common point, said lugs engageable with a mating opening in said struts and said openings in said plates mating with another opening in said struts to receive fastening means whereby said struts are mounted to said fixture such that extensions of their longitudinal axes intersect at a common point, the linear placement of said lugs and said openings formed in said web strut attachment plates all forming equal angles with respect to said base plate said angles being determined by; the desired depth of the resulting space frame structure.

3,914,064
MOUNTING ARRANGEMENT FOR SIDEWALK BUILDING EQUIPMENT OR THE LIKE

Raymond A. Gurries, 1499 Cherry Garden Lane, San Jose, Calif. 95110

Continuation of Ser. No. 122,586, March 1, 1971, abandoned. This application Nov. 19, 1973, Ser. No. 417,421
Int. Cl.² E01C *19/00*
U.S. Cl. 404—84 **4 Claims**

1. Controllable road building equipment or the like which comprises,

a main frame,

means mounting said frame for steered movement,

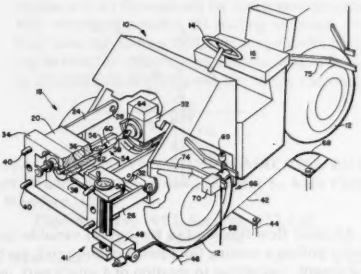
steering means for said frame,

means mounting an operational road building unit from said frame including

a first frame member mounted for height adjustment from said main frame, and

a second frame member mounted from said first frame member for pivotal adjustment relative thereto,

means for adjusting the height of said first frame member relative to said main frame,



light sensor means mounted from said first frame member adapted to sense lateral deviation thereof from a beam of light for controlling said steering means, and

light sensor means mounted on said first frame member adapted to sense height deviation thereof from the same beam of light for controlling said height adjusting means.

3,914,065

MULTI-COMPACTING MACHINE COMPRISING THREE OR MORE INTERARTICULATED UNITS FOR SOIL TAMPING

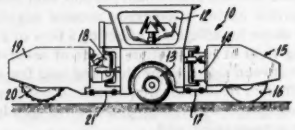
Domenico Domenighetti, Via Nosetto 6, 6500 Bellinzona, Switzerland

Filed Dec. 3, 1973, Ser. No. 420,860

Claims priority, application Switzerland, Dec. 19, 1972, 18710/72

Int. Cl.² E01C *19/26*

U.S. Cl. 404—123 **7 Claims**



1. A multiple machine for compacting soil and the like, comprising three compacting units interconnected by steering articulated joints, at least one of said joints interconnecting the two adjacent units for rotation relative to each other about three orthogonal axes, and power means for selectively controlling the swinging of said two units relative to each other about at least two of said three orthogonal axes thereby to permit control by an operator of the position of said two adjacent units relative to each other.

3,914,066

VANE ACTUATION SYSTEM

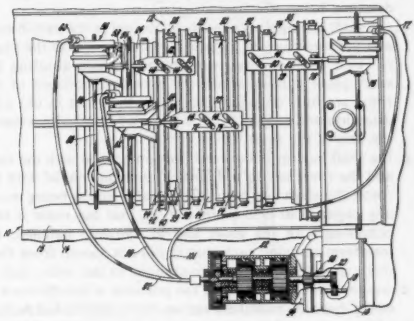
Noel L. Downing, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 27, 1974, Ser. No. 509,840

Int. Cl.² F04D *27/00*

U.S. Cl. 415—151 **2 Claims**

1. A high speed actuator system for controlling a row of individually rotatable crank operated vanes coupled to a control ring on the exterior of a turbine engine comprising; a rotary to linear drive actuator having a rotary input shaft and a reciprocating output shaft, means for coupling said reciprocating output shaft to the control ring for producing a predetermined arcuate movement of the control ring in response to reciprocation of the output shaft of the actuator, a drive transfer unit including a pair of electrically energized fluid gap clutch means, each of said clutch means including an input rotor and an output rotor, an energizable field coil for coupling said input and output rotors in accordance with energization thereof, an input shaft to said transfer unit connected



to both of said input rotors, a drive cable having one end thereof connected to the rotary input shaft of said actuator and the other end thereof to one of said output rotors, reversing gear means connecting the other of said output rotors to said drive cable, means for selectively energizing one or the other of said energizable field coils to produce reverse rotation of said drive cable thereby to produce reverse reciprocation of said actuator output shaft, thereby to control arcuate movement of the control ring to produce a controlled adjustment of the angular position of each of the crank operated vanes.

3,914,067

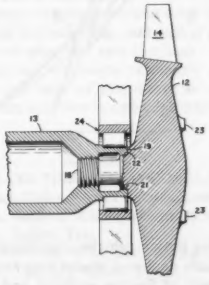
TURBINE ENGINE AND ROTOR MOUNTING MEANS

Anthony Leto, Franklin Lakes, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Nov. 30, 1973, Ser. No. 420,636

Int. Cl. F01d *25/00, 5/30*

U.S. Cl. 415—212 **4 Claims**



1. A gas turbine engine having a compressor, at least one turbine rotor having a bladed portion around the periphery thereof, the rotor receiving thermal input at the bladed portion during engine operation, and at least one shaft driven by the turbine rotor and driving the compressor, wherein the improvement comprises:

a. unitary rotor-retaining and torque-transmitting means coupling the rotor to the shaft and comprising a threaded portion of the shaft and a threaded portion of the rotor engaged therewith, the threaded portions being threaded in the direction of tightening with rotation of the rotor during engine operation, the rotor and compressor being in dynamic balance and the coupling means being under a state of torque at least equal to the aerodynamic torque on the rotor during engine operation so that no further tightening occurs during engine operation and accidental friction of the rotor against stationary engine portions does not cause alteration of angular relationships and dynamic balance;

b. the shaft having a plane surface normal to the axis thereof and the rotor having a plane surface parallel to the plane of rotor rotation, the rotor plane surface abutting the shaft plane surface when the threaded portions of the rotor are fully engaged to position the rotor in the axial direction and to maintain its plane of rotation normal to the axis of the shaft;

c. the shaft having a diametral portion coaxial with the shaft and the rotor having a diametral portion coaxial with the rotor, the shaft and rotor diametral portions being mutually engaged in interference fit so that the rotor is self-centering with the shaft and in dynamic balance, the interference being such that it will not loosen from thermal expansion during thermal input to the rotor; and

d. the threaded portions and the portions in interference fit being disposed relatively remote from the bladed portion of the rotor and thereby relatively insensitive to thermal input at the bladed portion.

3,914,068

FAN FOR MOTOR VEHICLES

Manfred Nonnenmann, Schwieberdingen, Germany, assignor to Suddeutsche Kuhlerfabrik, Stuttgart, Germany

Filed Jan. 16, 1973, Ser. No. 324,118

Claims priority, application Germany, Jan. 25, 1972, 2203353

Int. Cl.² F04D *29/38*

U.S. Cl. 416—132 **2 Claims**

1. In a fan for motor vehicles consisting of a hub and a plurality of radially deployed blades attached to the hub, said blades being made of flexible material and having a neutral axis, the improvement wherein the pitch angle of the blades is greater at the blade tips than the pitch angle at the blade roots and the thickness of the fan blades in the area of the neutral axis is greater than in the other parts of the blades, and wherein said neutral axis extends radially outwardly and perpendicular to the axis of rotation of the fan and along substantially the center line of the blade.

3,914,069

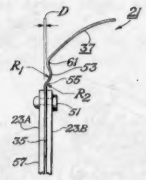
AXIAL FLOW FAN HAVING FULLY STREAMLINING FLEXIBLE BLADES

Earl J. Arrington, Arlington; Jerry E. Deal, Hurst, and Roger C. Hunsaker, Fort Worth, all of Tex., assignors to Fort Worth Pressed Steel Corporation, Fort Worth, Tex.

Filed June 6, 1973, Ser. No. 367,583

Int. Cl.² F04D *29/38*

U.S. Cl. 416—132 **21 Claims**



1. An axial flow flexible fan for use on variable speed engines for pulling a cooling fluid past a cooling coil, particularly at low speeds, responsive to rotation of a rotary part, including a shaft, driven by said engine, the fan being operable to automatically go to low pitch at higher relative engine and air flow speeds for low power consumption when not needed for pulling the cooling fluid past the cooling coil, comprising:

a. a spider that is adapted for being mounted on and rotated with said rotary part; said spider having an axis of rotation and having a plurality of arms extending radially outwardly with respect to said axis of rotation; and

b. a plurality of fan blades that are secured respectively to said arms along a line of attachment and adapted for inducing flow of said cooling fluid in a direction parallel to said axis of rotation; said blades having forward sides that are in the direction from which said cooling fluid flows with respect to rearward sides which effect flow of said cooling fluid; each said blade including:

i. a leading edge portion;

ii. an attachment portion overlapping a portion of its respective said arm and affixed thereto so as to rotate in unison therewith; said attachment portion being planar and co-engaging a planar portion of its said arm;

iii. a trailing flow-inducing portion extending away from said arm and attachment portion; said flow-inducing portion having a generally arcuate angularly disposed shape for efficiently effecting a flow of a gaseous cooling fluid at low relative speeds of relative movement between said cooling fluid and said fan and having sufficient flexure to streamline into position behind its rotating said arm at high said relative speeds for low power consumption; and

iv. a hinge portion intermediate said attachment portion and said flow-inducing portion; said hinge portion comprising:

I. a flexural groove extending the major portion of the length of said blade; said flexural groove traversing parallel with said attachment portion and located transversely and trailingly behind said arm for allowing said flow-inducing portion to go into its fully streamlined position without contact with said arm for full streamlining and low power consumption; said flexural groove having at least one arcuate region the cross sectional radius of curvature of which is, at all lines contained therewithin, within a critical range that is large enough to prevent a line of stress high enough to cause crystallization under flexure and small enough not to protrude beyond the dimensions of said arm in the direction of said flexural groove when said flow-inducing portion is streamlined at high speed such that low power is consumed; and II. a tangentially curved region adjacent said flexural groove and leading into said attachment

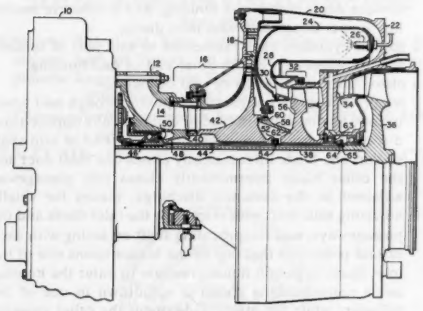
portion; said tangentially curved region having a radius of curvature large enough to prevent a line of stress high enough to cause crystallization under flexure and small enough to become tangent to the plane of said attachment portion; such that said trailing flow-inducing portions of said fan blades have high pitch at low relative speeds for pulling the cooling fluid past the cooling coil at low speeds and automatically go to a lower pitch at higher realative engine and air flow speeds for lower power consumption when not needed for pulling so much cooling fluid past the cooling coil; said hinge portion providing flexure for streamlining without fatigue failure do to crystallization during the life of the fan blade.

3,914,070

TWO-STAGE TIE-DOWN OF TURBOMACHINE ROTOR

Salvatore Straniti, Orange, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Nov. 19, 1973, Ser. No. 417,100
Int. Cl.² F01D *5/06*
U.S. Cl. 416—201 **2 Claims**



1. A turbomachine rotor comprising:

a central shaft;

a first bladed hub means having a central opening and telescoped over said shaft, said first bladed hub means comprising a single axial stage and a downstream centrifugal impeller abutting one another;

means for releasably securing said first hub means on said shaft with a first predetermined axial preload, said first means comprising a flange adjacent one end of said shaft and a threaded element axially holding said first hub means against said flange;

a second bladed hub means having a central opening and telescoped over said shaft adjacent said first hub means, said second hub means comprising a single stage axial flow turbine; and

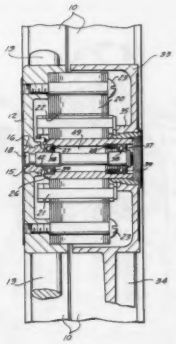
a second means for releasably securing said second hub means on said shaft against said first hub means with a second predetermined axial preload, said second means comprising a threaded element axially holding said second hub means against said first hub means, said first threaded element asserting a greater axial preload than said second threaded element, said first and second predetermined axial preloads preventing loosening of said first hub means when the second releasable securing means tightens said second hub means on said shaft.

3,914,071

ELECTRICALLY DRIVEN FAN

Karl E. Friese, Dover, N.H., assignor to IMC Magnetics Corporation, Westbury, N.Y.

Filed Feb. 27, 1974, Ser. No. 446,582
Int. Cl.² F04D *25/06*
U.S. Cl. 417—353 **4 Claims**



1. An electrically driven fan comprising

a. a frame,

b. a motor having a stator fixed to said frame and an annular shaped rotor rotatable with respect to said stator and frame,

c. a stationary shaft fixed at one end to said frame and projecting in cantilever fashion therefrom,

d. a sleeve fixed within said rotor and rotatable therewith, said sleeve surrounding said shaft, one end of said sleeve being closer to the fixed end of said shaft and the other being farther from said fixed end, and said sleeve being of such length that its farther end is located even with or beyond the free end of said shaft,

e. an extension fixed to said sleeve near its farther end, said extension surrounding and being radially spaced from said farther sleeve end,

f. a fan impeller fixed to said extension,

g. a pair of ball bearings between said sleeve and said shaft, the inner races of said bearings being fixed to said stationary shaft and the outer races being fixed to said sleeve and rotatable therewith, said bearings being spaced apart along the length of said shaft,

h. a cup-shaped cap within said extension and fitted over said farther end of said sleeve,

i. a resilient gasket between the end edge of said sleeve at its farther end and said cap, said gasket contacting both said sleeve end edge and said cap, and

j. means within said extension resiliently urging said cap toward said end edge of said sleeve so as to press said gasket between said sleeve end edge and said cap.

3,914,072

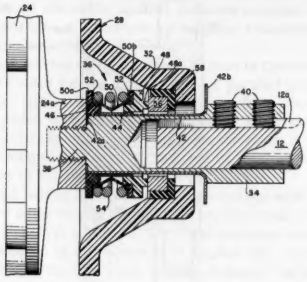
FLUID PUMPING ASSEMBLY

William N. Rowley, Palos Verdes Estates, and Gordon F. Ehret, Alhambra, both of Calif., assignors to Weil-McLain Company, Inc., Dallas, Tex.

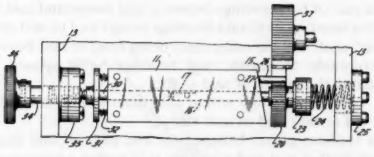
Filed Nov. 19, 1974, Ser. No. 525,099
Int. Cl.² F04D *29/10*
U.S. Cl. 417—423 R **8 Claims**

1. A fluid pump assembly comprising a pump housing defining an opening, an impeller disposed in said housing, shaft means extending through said opening for operatively connecting said impeller to an electric motor, a seal plate of a dielectric material extending within said opening for insulating said housing from said electric motor, said seal plate defining an opening for receiving said shaft means, seal means cooper-

ating with said shaft means and said seal plate for preventing the leakage of fluid from said housing, and a sleeve of a dielectric material extending over said shaft means and extending from said impeller to a point external of said seal plate opening, said sleeve having a flanged portion extending radially outward from a portion thereof external of said seal plate opening to direct any fluid radially outward from said shaft means.

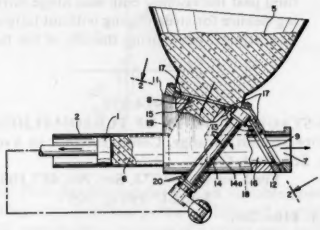


3,914,073
PRINTING INK PUMP
Ralph L. Fusco, 30 Fern Drive, Commack, N.Y. 11725
Filed Dec. 17, 1974, Ser. No. 533,478
Int. Cl.² F04B *7/06, 37/10;* **B41F** *31/02*
U.S. Cl. 417—500 **7 Claims**



1. A valveless positive displacement pump having a cylinder block, said cylinder block having a longitudinal bore therethrough and an intake and a discharge bore disposed perpendicularly of said longitudinal bore, and a piston disposed to rotate and simultaneously to reciprocate in said longitudinal bore, said piston having a flat side at the free end thereof, said flat side disposed to cooperate with both said intake and said discharge bores, respectively, said pump including a slanted end face on said cylinder block, a gear fixedly attached at the other end to said piston for rotatively driving said piston, said gear having a slider stud attached thereon, said stud disposed to be in a sliding engagement with said slanted face of said cylinder block, first means disposed at said other end of said piston to supply a pressure to said piston in a axial direction, and a non-rotatable rod axially slidable in said bore, said rod abutting at said free end of said piston, and second means disposed to adjust the position of said rod in said bore for controlling the length of the intake stroke of said piston.

3,914,074
APPARATUS FOR PUMPING LIQUID CONCRETE
Heinz Bille, Weissdornweg, 46 Dormund-Hombruch, Germany
Filed Apr. 13, 1973, Ser. No. 351,055
Claims priority, application Germany, Apr. 18, 1972, 2218697
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F04B *15/02, 35/00*
U.S. Cl. 417—516 **2 Claims**

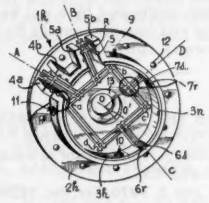


1. An apparatus for pumping liquid concrete comprising:
a housing having a pair of spaced-apart passageways exiting at a common discharge at one end thereof, a pair of inlet ducts each merging with one of said passageways at an oblique angle within said housing, and a concrete receiving hopper coupled to said inlet ducts;
a pair of cylinders each connected to said pair of spaced-apart passageways at the other end of said housing;
a piston disposed in each of said cylinders;
a reciprocating shaft angularly disposed through said housing and having a pair of blades, diametrically opposed and disposed at an oblique angle about one end of said shaft so that one blade intermittently closes one inlet duct and the other blade intermittently closes one passageway adjacent to the common discharge, means for axially adjusting said shaft with respect to the inlet ducts and the passageways, said reciprocating shaft co-acting with each of said pistons so that one of the blades opens one of the inlet ducts to permit liquid concrete to enter the housing as its corresponding piston is withdrawn in one of the cylinders while the other blade opens the other passageway adjacent to the common discharge while its corresponding piston is urged towards the housing permitting the liquid concrete to exit from the passageway into the common discharge.

3,914,075
SLIDING PARTITION ROTARY ENGINE WITH RECTILINEAR SEALS
Andre Brulfert, 6, rue des Peintres Parrocel, and Andre Gabriel Hoss, 23, Boulevard Saint-Ruf, both of Avignon, Vaucluse, France
Filed Feb. 11, 1974, Ser. No. 441,216
Claims priority, application France, Feb. 12, 1973, 73.04931; Feb. 20, 1973, 73.05496
Int. Cl.² F01C *19/00;* **F04C** *27/00;* **F16D** *57/00;* **F01C** *1/00*
U.S. Cl. 418—11 **9 Claims**

1. An engine of the rotor type comprising a circular, cylindrical stator formed by a casing defining an inner and circular face and two transverse end-plates each defining faces, said stator having admission and exhaust pipes for conveying a driving fluid; a rotor fixed on a shaft and adapted to be driven in rotation inside said stator, the transverse section of said rotor comprising a semi-elliptical lateral face portion and a semi-circular lateral face portion approximately equal to the circular section of said stator casing; fluid-tightness means forming hermetic seals disposed between said rotor and said stator, said means comprising rectilinear segments mounted in straight grooves formed in the faces of said stator and sur-

rounding said shaft, and a plurality of members operatively associated with said rectilinear segments and extending radially outwardly therefrom; and a system of partitions movable in a radial direction and arranged on said stator behind said admission pipe and in front of said exhaust pipe, said moving



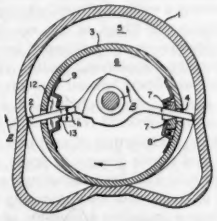
partitions co-operating with the composite lateral face of said rotor; said stator including an auxiliary fluid-admission pipe positioned behind said exhaust pipe and in front of said admission pipe which generates a braking effect on said semi-circular face portion of said rotor.

3,914,076

SEALING DEVICE FOR VANE-TYPE ROTATING MACHINE

Kitagawa Katsutoshi, Seto; Adachi Yoshiaki, and Dono Katsuyasu, both of Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Nov. 5, 1974, Ser. No. 521,059
Claims priority, application Japan, Apr. 16, 1974, 49-41822
Int. Cl.[2] F01C *19/08;* **F04C** *27/00*
U.S. Cl. 418—137 **1 Claim**



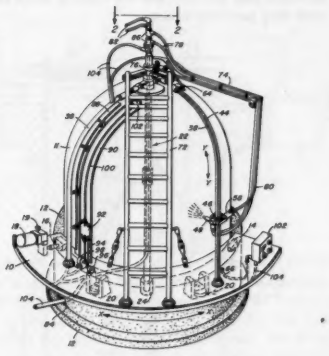
1. A sealing device for the ends of the vanes of a vane-type rotary machine having a housing enclosing a circular chamber in which the vanes rotate and having a surface against which the vanes are sealed; a hollow cylindrical rotor eccentrically mounted in the circular chamber in the housing for driving the vanes, the rotor having slots in its periphery forming openings in which the vanes are disposed; sealing means for sealing the front and rear faces of the vanes with respect to the openings; side sealing means for sealing the ends of the vanes with respect to the inside periphery of the rotor, said side sealing means comprising side shoe sealing elements engaging between the ends of the vanes and the inside periphery of the rotor to prevent air flow along the ends of the vanes, each of said shoes having an inwardly projecting portion covering an extended portion of an end of each of said vanes respectively; and retainer means carried on the inside periphery of said rotor for holding said side shoe sealing elements against the ends of said vanes with the projecting portion in alignment with and bearing on the ends of the vanes to provide a large contact area between said side shoes and the ends of said vanes.

3,914,077

APPARATUS FOR FORMING CURVILINEAR RESINOUS BUILDING STRUCTURES

Ralph R. Lodes, 45 Quentin Ave., Apt. 5B, New Brunswick, N.J. 08901

Filed May 15, 1974, Ser. No. 470,018
Int. Cl.[2] B29C *5/02*
U.S. Cl. 425—60 **19 Claims**



1. An apparatus for forming a curvilinear building structure of foam resin on an internally positioned inflated form member having a desired building configuration, said apparatus including scaffold means, means supporting said scaffold means above the ground adjacent to and externally of said inflated member for rotational movement about a generally vertical axis through said inflated member, said scaffold means having a platform portion shaped to generally conform to a portion of the outer face of the inflated member adjacent the lower portion thereof, said platform portion carrying a foam resin applicator assembly, said assembly comprising an elongated support means, an applicator head reciprocally mounted on said support means, said support means extending upwardly from said platform portion and spaced from but generally following the contour of said inflated member, means for rotating said scaffold means circumferentially around the lower portion of said inflated form member in a generally horizontal plane, means for moving the applicator head reciprocally and vertically along said support means, means for feeding foam resin material to said applicator head, and a contour plate mounted on said scaffold means trailing said applicator assembly in the direction of rotation of said scaffold means, said contour plate being curvilinearly shaped to conform to the desired outline of the building configuration extending vertically along substantially the entire height of said form in close juxtaposition to the inflated member to smooth the foam resin progressively applied thereto in order to provide an even outer surface thereto.

3,914,078

ULTRA-HIGH PRESSURE SYSTEM WITH VARIABLE LATERAL ANVIL SUPPORT

David P. Kendall, Troy, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 2, 1975, Ser. No. 538,048
Int. Cl.[2] B30B *11/32*
U.S. Cl. 425—77 **12 Claims**

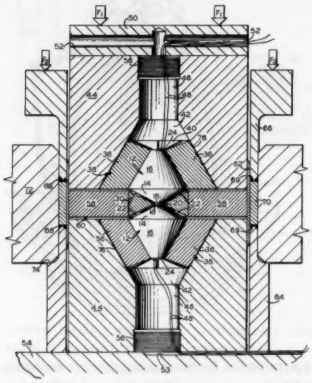
1. In a system for subjecting a workpiece to ultra-high pressures, the combination of,

a pair of oppositely disposed Bridgeman-type anvils having frustro-conical ends terminating in pressure faces for compressing the workpiece therebetween,

a plurality of segments surrounding each of said anvils adjacent said frustro-conical ends thereof to form a conical jacket for transmitting axial forces to said anvils while imparting compressive lateral stresses thereto to increase the internal resistance thereof to brittle failure,

a die ring spaced between said frustro-conical ends of said anvils in position to surround the workpiece,

a compressible gasket disposed between the workpiece and said die ring and extending outwardly into the space between said die ring and the conical anvil surfaces adjacent said pressure faces,



a segmented support ring surrounding the exterior periphery of said die ring, and

means for imparting compressive lateral forces to said support ring to stress said die ring for increasing the internal resistance thereof to the compression of said gasket whereby the correspondingly increased support imparted to said anvils prevents extrusion of the workpiece during the reduction in volume produced in response to the pressures thereagainst.

3,914,079

APPARATUS FOR PRODUCING BOARDS OF FILAMENTARY MATERIAL

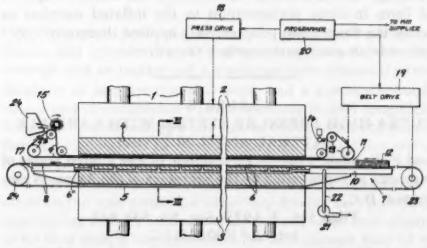
Harald Kober, Wanne-Eickel, Germany, assignor to G. Siempelkamp & Co., Krefeld, Germany

Filed July 23, 1973, Ser. No. 381,435

Claims priority, application Germany, July 29, 1972, 2237362

Int. Cl.[2] B29C *3/04*

U.S. Cl. 425—80 **6 Claims**



1. An apparatus for producing boards of filamentary material, comprising:

a press including a perforated lower platen and an upper platen spacedly overlying said lower platen, said platens being vertically reciprocable relatively to each other;

a perforated endless conveyor having an upper run passing between said platens;

support means for said conveyor provided with a perforated surface substantially level with said lower platen at least on an entrance side of the press underneath said upper run; and

suction means communicating with the perforations of said surface and of said lower platen for holding in position a filamentary mat, permeated by a wet hydraulic binder, deposited upon said conveyor outside the press for compaction between said platens.

3,914,080

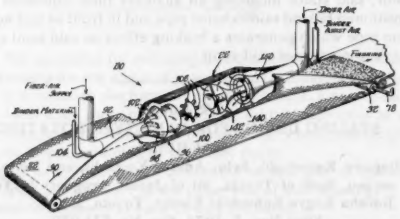
APPARATUS FOR THE HIGH SPEED PRODUCTION OF NON-WOVEN FABRICS

Ewald A. Kamp, Chicago, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed July 2, 1970, Ser. No. 51,967

Int. Cl.[2] B28B *5/02*

U.S. Cl. 425—83 **16 Claims**



1. Apparatus for producing a non-woven fibrous sheet-like web comprising: a flexible, endless foraminous belt; drive means for causing continuous longitudinal movement of said belt; fore and aft guide means engaging said belt for tubularizing and de-tubularizing a section of said belt; supply means for providing a suspension of fibers in air; nozzle means connected to said supply means and positioned intermediate said guide means within the tubularized section of said belt for directing a flow of said fibers toward the interior surface of said tubularized section of said belt; and exhaust means mounted in substantially coaxial relationship with at least a portion of the tubularized section of said belt in cooperative relationship with said nozzle means to apply suction to the exterior surface of said belt for promoting rapid deposit of fibers on said belt in the form of a substantially hollow tubular web, said nozzle means including a plurality of orifices which are focused toward said belt, said apparatus further including drive means for rotating said nozzle means in a path of movement generally away from the point of instantaneous impingement at said belt.

15. Apparatus for producing a non-woven fibrous web comprising: a flexible, endless foraminous belt; drive means for causing continuous, longitudinal movement of said belt; supply means for providing a suspension of fibers in air; nozzle means connected to said supply means and including a plurality of arcuately spaced orifices focused toward said belt for providing overlapping discharge patterns; and means for rotating said nozzle means in a path of movement generally away from the point of instantaneous impingement at said belt, said belt surrounding a substantial region of said nozzle means, whereby said discharge orifices scan the surface of said belt.

16. Apparatus for producing a non-woven fibrous sheet-like web comprising: a flexible, endless foraminous belt; drive means for causing continuous longitudinal movement of said belt; fore and aft guide means engaging said belt for tubularizing and de-tubularizing a section of said belt; supply means for providing a suspension of fibers in air; nozzle means connected to said supply means and positioned intermediate said guide means within the tubularized section of said belt for

directing a flow of said fibers toward the interior surface of said tubularized section of said belt; and exhaust means mounted in substantially coaxial relationship with at least a portion of the tubularized section of said belt in cooperative relationship with said nozzle means to apply suction to the exterior surface of said belt for promoting rapid deposit of fibers on said belt in the form of a substantially hollow tubular web, said nozzle means including orifice means focused toward said belt, said apparatus further including drive means for rotating said nozzle means in a path of movement generally away from the point of instantaneous impingement at said belt.

3,914,081

APPARATUS FOR INJECTION MOLDING TWO-COLORED PRODUCTS

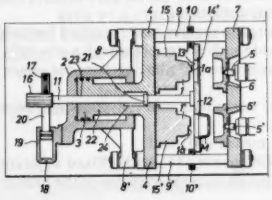
Katashi Aoki, 6037, Oaza Minamijo, Sakaki, Hanishina, Nagano, Japan

Division of Ser. No. 100,604, Dec. 22, 1970, abandoned. This application Dec. 7, 1972, Ser. No. 312,991

Claims priority, application Japan, Dec. 29, 1969, 44-105181

Int. Cl.[2] B29C *9/00;* **B29F** *1/12*

U.S. Cl. 425—130 **3 Claims**



1. An injection molding appartus for injection molding two-colored products comprising:

A. two spaced sets of molds including coactive male and female mold-halves, said mold-halves being reciprocably movable with respect to one another to open and closed positions;

B. a stripper plate movably positioned intermediate the mold-halves;

C. means for reciprocating and rotating said stripper plate to successively remove a primary molded product from the mold-halves of a first mold set, rotate said stripper plate to juxtapose a primary molded product with a second said mold set and position the primary mold product in the second said mold set; and

D. means for injecting molding material separately into said mold sets.

3,914,082

MACHINE BASE FOR INJECTION MOLDING MACHINES

Karl Hehl, Siedlung, 7291 Lossburg, Wuertt, Germany

Filed Apr. 18, 1973, Ser. No. 352,452

Claims priority, application Germany, Apr. 19, 1972, 7214780

Int. Cl.[2] B29F *1/00*

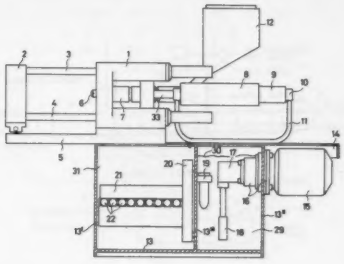
U.S. Cl. 425—192 **10 Claims**

1. A machine base for injection molding machines, especially for machines of the type which include a horizontally mounted die closing unit and a skid-supported horizontally aligned injection unit connected to the rear of the die closing unit, comprising in combination:

a generally rectangular, block-shaped base body which includes a floor panel, generally upright front and rear walls and adjoining side walls, thereby defining a base cavity;

a tank compartment for hydraulic fluid arranged in the rear portion of the base body, the rear wall of the base also being the rear wall of the tank compartment;

a horizontal mounting face on top of the forward portion of the base body for the support of the die closing unit; and a horizontal cover plate removably mounted on top of the



rear portion of the base body for the support of the skids of the injection unit; the cover plate overhanging rearwardly a distance from the rear wall of the base body to form an extended supporting surface for the injection unit, when the latter is moved to the rear, out of engagement with the die closing unit, the cover plate thereby also serving as a cover for the tank compartment.

3,914,083

ROLLING APPARATUS FOR MANUFACTURING PLASTIC GEARS

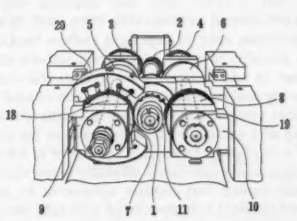
Toshimasa Arai, Nagoya, Japan, assignor to President of Nagoya Institute of Technology, Kokichi Sano, Nagoya, Japan

Division of Ser. No. 340,531, March 12, 1973, Pat. No. 3,852,400. This application Apr. 4, 1974, Ser. No. 457,699

Claims priority, application Japan, Mar. 18, 1972, 47-27942

Int. Cl.[2] B29D *15/00;* **B29C** *15/00*

U.S. Cl. 425—324 R **5 Claims**



1. Apparatus for making plastic gears comprising a first shaft, a gear blank mounted on said first shaft, a second shaft disposed parallel to said first shaft, a cold instrument mounted on said second shaft, means for moving said second shaft in a direction perpendicular to the longitudinal axis of said second shaft to thereby move said cold instrument into and out of contact with said gear blank, a third shaft disposed parallel to said first shaft, a hot instrument mounted on said third shaft, means for moving said third shaft in a direction perpendicular to the longitudinal axis of said first shaft to thereby move said third shaft into and out of contact with said gear blank, and means for synchronously driving said first, second and third shafts whereby said hot instrument forms gear teeth in an initial operation on said gear blank and said cold instrument performs a finishing operation on said gear teeth.

3,914,084
CONTINUOUS MOLDING MACHINE

Andrew T. Kornylak, Hamilton, Ohio, assignor to Kornylak Corporation, Hamilton, Ohio

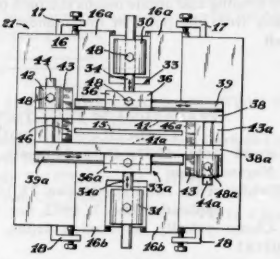
Filed Nov. 6, 1973, Ser. No. 413,358
Int. Cl.² B29D 7/14
U.S. Cl. 425—329 6 Claims

1. Apparatus for continuously producing a rigid foam synthetic resin product of three dimensionally configured uniform cross section throughout its indefinite length, comprising: at least two substantially opposed highly flexible endless belts having a relaxed cross sectional configuration, transverse to the belts, that corresponds to the three dimensionally configured surface to be formed on the product; means guiding said belts for travel in respective desired endless paths lying generally in a common plane, with opposed generally rectilinear molding runs closely adjacent each other forming therebetween a molding tunnel, with return runs, and with transitional curved protions between said runs for each belt; said belts being of a material sufficiently resilient to bend without permanent deformation toward a planar configuration when traversing said transitional curved portions; support means including a rigid endless backup coveyor for each of said belts traveling in an endless path generally within the path of its respective belt and generally in said common plane; each of said rigid endless backup conveyors comprising a plurality of plates serially connected together by hinge means in an endless chain traveling in a path having a generally rectilinear belt backup run closely adjacent and parallel its respective belt molding run, a return run, and opposite end transitional curved runs spaced considerably from said belt transitional curved portions; each of said rigid endless backup conveyors having a plurality of metal blocks respectively corresponding in number to and integrally secured to the surface of said plates facing said its associated belt; each of said blocks being of identical cross section transverse to the conveyor length, and being of a width substantially equal to the corresponding width of said plates; the adjacent plates of at least one of said rigid endless conveyors being pivotally connected together for substantial limited lost motion transverse to said common plane; said resilient belt associated with said one conveyor, at one side generally overlaping the adjacent belt and movable into abutting engagement with each other in one transverse direction when moved parallel to the pivoting connection of the adjacent plates in the molding zone, and at the other side having sliding engagement with the adjacent belt in the same transverse direction; backup guide means for moving said rigid endless conveyors toward each other with a predetermined spacing between the opposed plates of said rigid endless conveyors at the entrance of said molding zone and maintaining said spacing throughout the length of said molding zone; and said backup guide means further shifting successive plates of said one conveyor in said transverse direction downstream from said entrance for a substantial transverse distance to tightly clamp the adjacent abutting belt surfaces at said one side and to provide wiping sliding contact for the belt sliding surfaces at said other side, and further maintaining said shifted position throughout the remaining portion of said molding zone.

3,914,085
EXTRUSION APPARATUS

Donald A. Kruelskie, Wheelersburg, Ohio, assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 255,270, May 22, 1972, abandoned.
This application Jan. 7, 1974, Ser. No. 431,273
Int. Cl.² B29D 7/04; B29F 3/04
U.S. Cl. 425—380 7 Claims



1. An extrusion apparatus (10) suited to extrude a heat plastified synthetic resinous foamable extrudable composition, the apparatus comprising

a die (13) adapted to receive heat plastified foamable material and extrude such material through a generally polygonal extrusion orifice (15) having opposed edges, the die (13) having

a die face (16) containing said polygonal extrusion orifice (15),

a first support means (30) and

a second support means (31) both affixed adjacent the die face and disposed on opposite sides of the orifice (15), at least

first (33) and

second shaping assemblies (33*a*) adjustably supported by said first and second support means, respectively, each shaping assembly comprising

a first assembly support member (34, 34*a*) adjustably supported in the support means (30 and 31),

a first shaping member (38, 38*a*) adjustably supported in the first assembly member (34, 34*a*) and moveable in a direction generally normal to the first support member (34, 34*a*), and

a second shaping member (43, 43*a*) adjustably supported on said first shaping member (38, 38*a*) and moveable in a direction generally normal to the direction of motion of the first shaping member (38, 38*a*) and generally parallel to the motion of the first assembly member (34, 34*a*), the first (33) and second guide assemblies (33*a*) being in facing oppositely disposed relationship and adjustable to form a passage of generally rectangular cross-sectional configuration about the extrusion orifice (15) and external to the die (13).

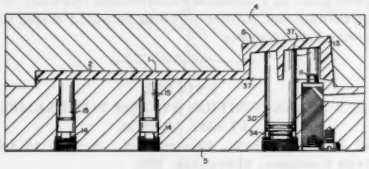
3,914,086
EJECTOR DEVICE FOR INJECTION MOLDING APPARATUS

Ladislav Hujik, Batawa, Canada, assignor to Bata Show Company, Inc., Belcamp, Md.

Filed Oct. 29, 1974, Ser. No. 519,017
Claims priority, application Canada, Oct. 29, 1973, 184460
Int. Cl.² B29F 1/14; B29C 7/00; B29H 7/08
U.S. Cl. 425—437 6 Claims

1. An ejector device for use in an injection molding apparatus, in which a sole is molded in a mold cavity defined by a mold top, a mold bottom and a heel cleat on said mold bottom extending into a heel cavity in the mold top, the heel cleat including a plurality of prongs, said ejector device comprising an ejector pin including a plurality of fingers equal in number

to the number of prongs on said cleat, each of said fingers being slidably mounted in and forming a part of one of said prongs, pressure means for thrusting said ejector pin against the interior of the heel to eject the heel from the bottom mold a guide post fixedly mounted in a hole in said bottom mold,



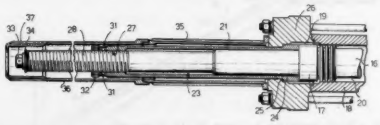
means slidably mounting said ejector pin on said guide post, said pressure means including a duct for introducing air under pressure beneath said ejector pin in said bottom mold to force said ejector pin out of said bottom mold, and means for returning the ejector pin to a rest position.

3,914,087

DEVICE FOR ADJUSTING THE OPENING TRAVEL OF THE MOVABLE PLATE OF A MOULDING MACHINE FOR PLASTIC MATERIALS

Mario Brocchi, Lugano, Switzerland, assignor to F. Lli Sandretto S.a.s., Turin, Italy

Filed Aug. 26, 1974, Ser. No. 500,816
Int. Cl.² B29F *1/06*
U.S. Cl. 425—451.9 **4 Claims**



1. A device for adjusting the opening travel of a mould holder unit of machine for moulding plastic materials, comprising:

a movable plate which is arranged to support a portion of the mould, said plate being movable, during the opening travel, from a first position, in which said mould is closed, to a second position in which said mould is open;

a cylinder comprising a piston movable in a casing adapted to actuate said movable plate;

a part rigidly connected to said piston;

a member movable axially relative to the piston, and mounted on said part, fixable manually with respect to the piston and arranged to cooperate with a portion of said casing in order to stop the piston during said opening travel.

3,914,088

APPARATUS FOR, AND METHOD OF, OXIDIZING A GASEOUS MIXTURE CONTAINING A COMBUSTIBLE COMPONENT

Robert T. Huyck, Kenmore, N.Y., assignor to Roberts-Gordon Appliance Corporation, Buffalo, N.Y.

Filed Oct. 24, 1974, Ser. No. 517,404
Int. Cl.² F23D *13/20*
U.S. Cl. 431—5 **9 Claims**

7. The method of oxidizing a gaseous mixture containing a combustible component, comprising the steps of:

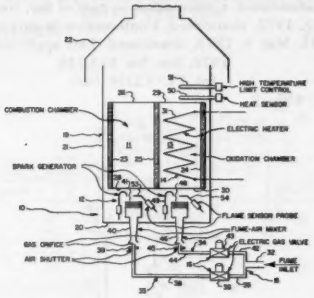
supplying a flow of said mixture from a source thereof;

sensing the combustibility of such supplied mixture;

delivering such supplied flow to a combustion chamber if said mixture is sensed to be combustible;

igniting and burning such mixture in said combustion chamber;

delivering such supplied flow to heated oxidation chamber if said mixture is sensed to be incombustible; and



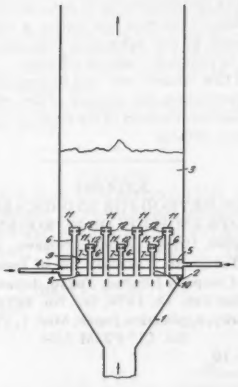
oxidizing such incombustible mixture in said oxidation chamber.

3,914,089

DISTRIBUTOR PLATE

Denis Henry Desty, Weybridge, and Howard Cervase Lunn, Camberley, both of England, assignors to The British Petroleum Company Limited, London, England

Filed Jan. 17, 1973, Ser. No. 324,401
Claims priority, application United Kingdom, Jan. 26, 1972, 3611/72; Jan. 26, 1972, 3612/72
Int. Cl.² F23D *19/00*
U.S. Cl. 431—7 **8 Claims**



1. A method of burning oil in a fluidised bed, comprising the steps of:

positioning at least one tube below the fluidised bed for communication with the fluidised bed at one end;

continuously introducing oil in liquid form directly onto the inside wall of the tube at a point intermediate its length to form a film thereon; and

continuously introducing a fluidizing gas containing oxygen into the tube at a point below the point of introduction of the oil and passing the fluidised gas through the tube to cause the film of oil to climb up the inside wall of the tube and communicate with the fluidised bed for burning thereon.

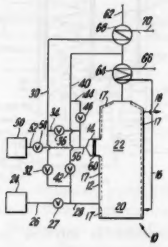
3,914,090
METHOD AND FURNACE APPARATUS

William C. Pfefferle, Middletown, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. No. 142,939, May 13, 1971, abandoned, Continuation-in-part of Ser. No. 164,718, July 21, 1971, abandoned, Continuation-in-part of Ser. No. 252,916, May 12, 1972, abandoned, Continuation-in-part of Ser. No. 358,411, May 8, 1973, abandoned. This application Oct. 8, 1974, Ser. No. 513,139

Int. Cl.² F23M *3/00*

U.S. Cl. 431—9 **46 Claims**



1. The method of combusting carbonaceous fuel to produce energy in the form of heat comprising the steps of:

thermally combusting a first mixture, formed of a first carbonaceous fuel and an amount of air substantially less than that needed for complete combustion to carbon dioxide and water of all the combustible components in said first fuel, to produce a gaseous first effluent;

forming a second mixture of a second carbonaceous fuel and air;

combusting at least a portion of said second mixture under essentially adiabatic conditions in the presence of a solid oxidation catalyst operating at a temperature substantially above the instantaneous auto-ignition temperature of said second mixture but below a temperature that would result in any substantial formation of oxides of nitrogen to produce a second effluent;

mixing said first effluent and said second effluent; and

thermally combusting the mixture of first effluent and second effluent downstream of the catalyst to produce a final combustion effluent.

3,914,091
COMBUSTION METHOD FOR HYDROCARBONIC FUELS WITH LOW EMISSION OF NITROGEN OXIDES

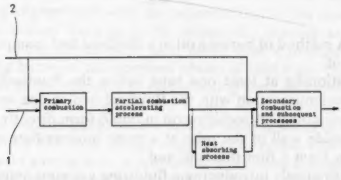
Kazuo Yamagishi, Urawa; Masaaki Nozawa, Yokohama, and Tsunenori Tokumoto, Yokosuka, all of Japan, assignors to Tokyo Gas Company Limited, Tokyo, Japan

Filed Feb. 28, 1974, Ser. No. 447,035

Claims priority, application Japan, Mar. 1, 1973, 48-24697

Int. Cl.² F23M *3/04*

U.S. Cl. 431—10 **2 Claims**



1. A combustion method for hydrocarbonic fuel which results in low emission of nitrogen oxides comprising a primary combustion step of mixing a hydrocarbonic fuel with air in the amount of less than **70** per cent of the theoretically required amount for complete combustion of the fuel and then accelerating the partial combustion in the presence of a nickel catalyst to decompose the fuel into simple inorganic gases consisting mainly of H_2 and CO as combustible components, and a secondary combustion step of transferring the simply inorganic gases to a secondary combustion chamber for completing combustion, further air being provided in said secondary combustion chamber.

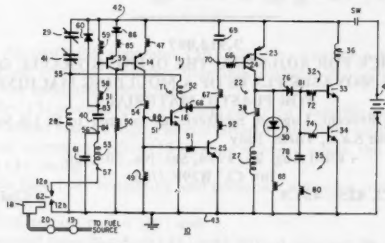
3,914,092
DIRECT SPARK IGNITION SYSTEM WITH SAMPLING FLAME SENSOR

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Service Company, Milwaukee, Wis.

Filed Sept. 23, 1974, Ser. No. 508,417

Int. Cl.² F23Q *3/00*

U.S. Cl. 431—66 **17 Claims**



1. In a fuel ignition system including valve means operable when energized to supply fuel to a fuel outlet, an ignition circuit for controlling the operation of said valve means and for igniting fuel discharged by said fuel outlet, said ignition circuit comprising ignition means operable when enabled to generate ignition sparks in the proximity of said fuel outlet, energizing means controlled by said ignition means to energize said valve means to supply fuel to said fuel outlet for ignition by said ignition sparks to establish a flame, sensing means enabled whenever a flame is established to disable said ignition means during a first period to inhibit the generation of ignition sparks and for enabling said ignition means to generate ignition sparks during a second period, and indicator means controlled by said energizing means to provide a first indication each time an ignition spark is generated, and to provide a second indication whenever said ignition means fails to produce ignition sparks during said second period.

3,914,093
COMBUSTION APPARATUS

Albert Edward Proctor, Burnham, England, assignor to Flaregas Engineering Limited, West Drayton, England

Claims priority, application United Kingdom, Jan. 18, 1973, 2626/73

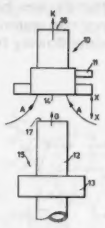
Filed Jan. 9, 1974, Ser. No. 431,903

Int. Cl.² F23H *1/08;* **F23D** *13/40*

U.S. Cl. 431—89 **13 Claims**

1. In an apparatus for mixing air with waste gas for combustion, said apparatus having means for discharging waste gas and having a separate air inducing device which operates in the manner known as Coanda Effect, said air inducing device being axially spaced from said discharge means, said air inducing device having a main inlet for receiving the waste gas emitted by said discharging means together with air induced

into said device; the improvement comprising means for varying the distance between the main inlet of the air inducing



device and the discharging means whereby to control mixing and combustion.

3,914,094

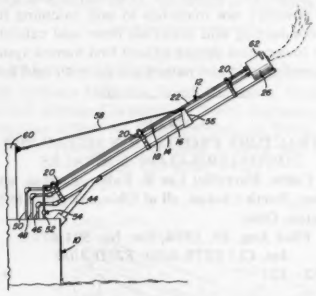
WASTE OIL BURNER

Ronald J. Landry, Rte. 3, Box 237, Lafayette, La. 70501

Filed June 3, 1974, Ser. No. 476,161

Int. Cl.² F23C *11/00*

U.S. Cl. 431—202 **9 Claims**



1. A waste oil burner including an oil conduit having inlet and outlet ends and a spray nozzle supported from and closing said outlet end, said inlet end being adapted to be communicated with a source of waste oil under pressure, said nozzle including an inlet communicated with the interior of said conduit, a valve member, pressure responsive support and shifting means disposed within said conduit and supporting said valve member for movement into and out of position closing said nozzle inlet, said pressure responsive means including means operative in response to an increase in oil pressure within said conduit above a predetermined pressure to shift said valve member out of position closing said nozzle inlet and in response to a reduction in oil pressure within said conduit below said predetermined pressure to shift said valve member into position closing said nozzle inlet, a support, an inclined boom extending upwardly and outwardly from one side of said support, said spray nozzle being supported from and opening outwardly of the upper outer end of said boom, the outer end of said boom also including ignition means for igniting atomized waste oil spray discharged from said nozzle, the outer end of said boom including a tubular cone-shaped air venturi opening at its discharge end endwise outwardly of the outer end of said boom, said nozzle being generally centered in the discharge end of said venturi, said boom including an outer end open ended tubular shield generally centered about and of considerably greater inside dimensions than the outside dimensions of said venturi.

3,914,095

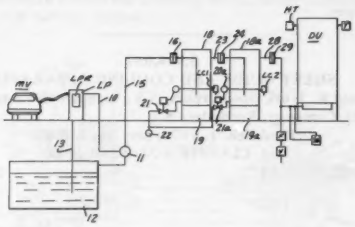
VAPOR DISPOSAL SYSTEM

John F. Straitz, III, Jenkintown, Pa., assignor to Combustion Unlimited Incorporated, Elkins Park, Pa.

Continuation-in-part of Ser. No. 313,504, Dec. 8, 1972, abandoned. This application Sept. 16, 1974, Ser. No. 506,166

Int. Cl.² F23G *7/06*

U.S. Cl. 431—202 **23 Claims**



1. Apparatus for collection and disposal by combustion of combustible vapor from a tank displaced by liquid introduction loading which comprises

a pump for delivery of liquid to the tank,

a combustible vapor collector pipe associated with the tank for collection of vapors displaced therefrom under pressure by liquid introduced into the tank by the pump,

a disposal unit for combustion of said vapor comprising a combustion chamber,

a connection from said vapor collector pipe to said combustion chamber for delivery of vapor to said combustion chamber for combustion and having a plurality of flame arresters interposed therein,

a vapor burner supplying said vapor to said combustion chamber for combustion therein,

burner means for burning fuel in said combustion chamber to provide an oxidizing zone therein aiding the combustion of said vapor from said vapor burner,

air supply means for admitting air to said combustion chamber for combustion of said vapor and of said fuel from said burner means, and

means responsive to a condition in said apparatus for controlling said pump.

3,914,096

DEVICE FOR VAPORIZING FUEL OIL

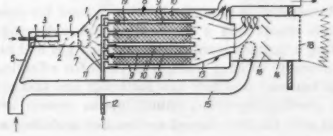
Hermann J. Schladitz, 74 Plaentschweg, Munich, Germany

Filed Apr. 3, 1974, Ser. No. 457,629

Claims priority, application Germany, Apr. 6, 1973, 2317477

Int. Cl.² F23D *11/44*

U.S. Cl. 431—208 **7 Claims**



1. Apparatus for vaporizing liquid fuel comprising an electrically heatable porous body composed at least partially of polycrystalline metal whiskers, means for supplying liquid fuel to the porous body, a first mixing chamber into which said body delivers, an air source connected to said first mixing chamber, a first combustion chamber into which said first

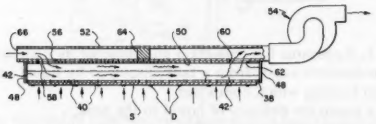
mixing chamber discharges, a heat exchanger composed at least partially of polycrystalline metal whiskers and adjacent the first combustion chamber, the heat exchanger being arranged to be heated by hot combustion gases from the fuel burned in the first combustion chamber and providing heat exchange paths for a liquid fuel which is to be vaporized thereby, a second mixing chamber adjacent the heat exchanger and into which said paths deliver, an air source connected to said second mixing chamber, and a second combustion chamber into which said second mixing chamber discharges.

3,914,097

SHEET GUIDE AND COOLING APPARATUS

Donald R. Wurl, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 1, 1974, Ser. No. 438,829
Int. Cl.² F27B *9/28;* **F26B** *19/00*
U.S. Cl. 432—59 **3 Claims**



1. In an apparatus for processing a sheet bearing a developed image, said apparatus having a fixing station for receiving the sheets and rendering said developed image permanently fixed to the sheet by application of heat and pressure, means for establishing a sheet travel path downstream of said fixing station, said path extending in a given plane substantially coplanar with the plane of sheet travel in said fixing station, said means comprising:

guide means defining a thermally conductive sheet guide surface parallel to and closely adjacent said given plane downstream of said fixing station, said guide means including an elongated guideplate a series of openings extending therethrough, said guideplate having at least one thermally conductive fin extending therefrom to facilitate cooling of said sheet, said fin being located out of said sheet travel path; and

means for positively maintaining successive incremental portions of sheets traveling in said path in face-to-face contact with said sheet guide surface for at least a predetermined period as such sheets move along said path.

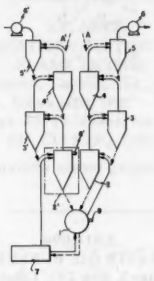
3,914,098

SUSPENSION-TYPE PREHEATING SYSTEM FOR POWDERY RAW MATERIALS

Saburo Kano, Tokyo; Tatsuo Sasaki, Chiba, and Toshihiro Kobayashi, Tokyo, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Ote, Japan

Filed Nov. 9, 1973, Ser. No. 414,249
Int. Cl.² F27B *7/02*
U.S. Cl. 432—106 **2 Claims**

1. A suspension type pre-heating system for powdery raw materials comprising a pre-heating-with-exhaust-gas system including a furnace transmitting exhaust gas and also including a plurality of heat transfer devices for effecting heat exchange between powdery raw materials and said exhaust gas, and a pre-heating-with-combustion-gas system arranged in parallel with the first named system and including a calcining furnace transmitting combustion gas and also including a plurality of heat transfer devices for effecting heat exchange between powdery raw materials and said combustion gas, the heat transfer devices of the first named system being arranged in series from an upper device to a lower device, and the devices being connected by a duct system for the powdery raw materials so that the latter may be gradually heated while flowing from an upper device to a lower device, the pre-heating-with-combustion-gas system including a plurality of heat transfer devices for effecting heat exchange between powdery raw materials and said combustion gas, the latter heat transfer devices being arranged in series from an upper device to a lower device, and said latter devices being connected by a duct system for the powdery raw materials so that the latter may be gradually heated while flowing from an upper device



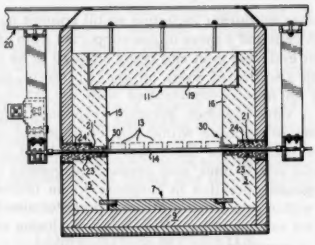
to a lower device, means for connecting a lower device of the pre-heating-with-exhaust-gas system and a lower device of the pre-heating-with-combustion-gas system for combining the pre-heated materials, means for conducting the combined pre-heated powdery raw materials to said calcining furnace, means for conducting said materials from said calcining furnace to the lower-most device of said first named system and means connecting said last named device with said furnace.

3,914,099

REFRACTORY PROTECTION SHIELD FOR CONTINUOUS FLOW FURNACES

Stephen J. Cable, Hartville; Lee R. Fuller, Canton, and John H. Hothem, North Canton, all of Ohio, assignors to Spartek Inc., Canton, Ohio

Filed Aug. 29, 1974, Ser. No. 501,671
Int. Cl.² F27B *9/00;* **F27D** *3/00*
U.S. Cl. 432—121 **9 Claims**

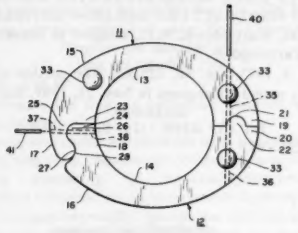


1. In a roller hearth kiln having freely, relatively movable upper and lower tunnel sections joined along longitudinal parting lines along each sidewall and having a plurality of horizontally disposed rollers extending through the joint formed along said parting lines and a packing means closing said joint; a shield means along said joint to protect said packing from contact by products moving along said rollers through the said kiln, said shield means comprising a plurality of co-planar refractory plates movably suspended from the inner face of the sidewalls of the upper section of said kiln each of said plates being of generally rectangular configuration and having beveled vertical edges and a lower edge disposed below the tops of said horizontally disposed rollers.

3,914,100
PIPE PROTECTIVE COVERING

Lee Guskea, Steubenville, Ohio, assignor to Wheeling-Pittsburgh Steel Corporation, Pittsburgh, Pa.

Filed July 29, 1974, Ser. No. 492,684
Int. Cl.² F27D 3/02
U.S. Cl. 432—234 10 Claims

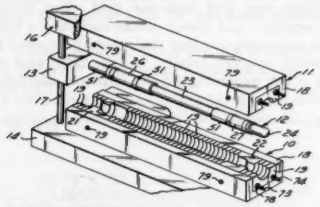


1. Pipe protective covering comprising a pair of hollow ceramic tiles shaped to enclose a pipe, the inner surface of each tile in cross section comprising a semi-circle, the tiles meeting along their edges in interengaging surfaces, one pair of such surfaces being contoured to hinge on each other and the other pair of such surfaces being contoured to separate by movement through an arc centered in the hinge axis.

3,914,101
APPARATUS FOR FORMING CORRUGATED TUBING

Joseph Anthony Stefanka, North Baltimore, Ohio, assignor to Norbalt Rubber Corporation, North Baltimore, Ohio

Division of Ser. No. 192,439, Oct. 26, 1971, Pat. No. 3,833,699. This application June 3, 1974, Ser. No. 475,600
Int. Cl.² B29C 17/07
U.S. Cl. 425—387 R 19 Claims



1. An apparatus for forming corrugated tubing comprising a separable mold which can be opened and closed, said mold when closed providing an interior mold surface having spaced portions shaped to form the ends of such tube and an intermediate portion shaped to form extended corrugations, an inflation mandrel providing a radially expandable member enclosed within said mold when said mold is closed operable when pressurized to radially expand from its deflated position to radially deform an initial cylindrical tube of plastically deformable material into mating engagement with said mold thereby forming an uncured intermediate tube, said mold when opened and said mandrel is deflated permitting removal of said intermediate tube without substantial distortion.

3,914,102
APPARATUS FOR FOLDING CONTAINER RIMS

Gaylord William Brown, Beaverton, Mich.

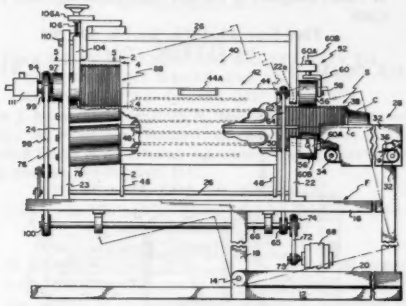
Filed Sept. 16, 1974, Ser. No. 506,406
Int. Cl.² B29C 17/02; B29D 7/22
U.S. Cl. 425—392 13 Claims

1. Apparatus for forming deformable projecting rims or flanges provided on the sidewalls of individual containers of a stack of nested containers or the like comprising:

a frame;

means on said frame for heating the rims to a deformable state at a rim heating station;

rim turning roller means, rotatable on said frame about an axis, having a plurality of spiral flights defining a plurality of spiral rim turning groove means about the peripheral surface thereof for receiving and turning the heated rims inwardly toward the sidewalls of successive containers at a rim turning station;



means for rotating said rim turning roller means about its longitudinal axis and for rotating said stack about its longitudinal axis while concurrently axially forwardly feeding said stack through said heating and turning stations; and

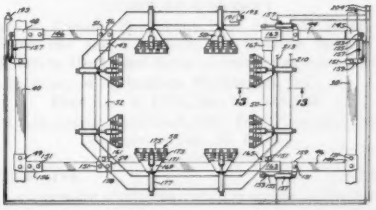
means for receiving said stack and maintaining said rims in said groove means as the containers move axially through said rim turning station to turn portions of radially inwardly said rims;

said rim turning roller means being angularly offset relative to said longitudinal axis of said stack such that the portions of said spiral groove means receiving said rims lie in parallel planes perpendicular to the axis of said stack.

3,914,103
ABSTRACT HAVING PRODUCT EJECTION MEANS FOR FORMING PLASTIC

Donald E. Dean, San Pedro, and John Alesi, Jr., Topanga, both of Calif., assignors to Formex Manufacturing, Inc., Venice, Calif.

Filed Sept. 23, 1974, Ser. No. 508,704
Int. Cl.² B29C 17/04
U.S. Cl. 425—397 8 Claims



1. In a sheet molding machine having transfer means including at least one open frameworks formed of frame bar members with sheet edge clamping means carried on said bar members for moving sheets of thermoplastic between opposed die faces, for supporting said sheets against said die faces during the molding thereof into a formed product, and for transferring said formed product from said die faces, the

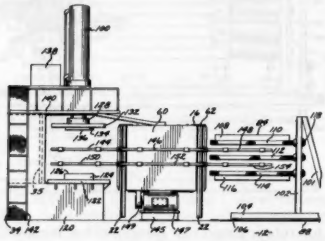
improvement of formed product ejection means comprising bracket members carried by at least one of said bar members and slidably engaged on a vicinal bar member with actuation means to effect the reciprocal movement thereof whereby said frameworks may be expanded and contracted to facilitate the removal of formed product therefrom.

3,914,104

APPARATUS HAVING SAFETY MEANS FOR FORMING PLASTIC SHEETS

Donald E. Dean, San Pedro, and John Alesi, Jr., Topanga, both of Calif., assignors to Formex Manufacturing, Inc., Venice, Calif.

Filed Sept. 23, 1974, Ser. No. 508,705
Int. Cl.² B29C 17/04
U.S. Cl. 425—397 **9 Claims**



1. A molding machine for forming separate sheets of thermoplastic into a hollow enclosure which comprises:

sheet transfer means including upper and lower vertically spaced apart frameworks bearing sheet edge supporting and clamping means;

driver means to effect movement of said transfer means whereby said frameworks can be moved to a heating station;

heating means at said heating station comprising a plurality of vertically spaced apart heating elements in alignment with said frameworks to be located therebetween when said frameworks are at said heating station; and

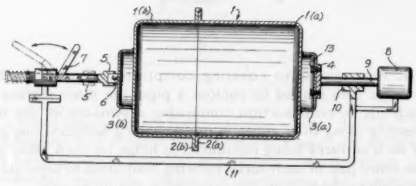
supporting structure for said heating means including a base that is movably mounted in said molding machine between said heating station and a withdrawn position therefrom whereby said heating means can be withdrawn from said frameworks and thermoplastic sheets supported thereon without effecting movement of said transfer means.

3,914,105

MULTIPLE PIECE MOLD APPARATUS AND METHOD TO MANUFACTURE HOLLOW ARTICLES

Stuart Pivar, Muttontown, N.Y., assignor to Rototron Corporation, Farmingdale, N.Y.

Filed Feb. 5, 1973, Ser. No. 329,374. The portion of the term of this patent subsequent to Nov. 21, 1989, has been disclaimed.
Int. Cl.² B28B 1/20; B29C 1/16
U.S. Cl. 425—435 **11 Claims**



1. Apparatus for the molding of a hollow article from thermoplastic material, said apparatus comprising a hollow mold including first and second parts having a common axis of rotation and including engageable edges at which the parts abut to seal the mold against the leakage of said material, rotation means to support one of said parts and to rotate the same on said axis, and clamp means to clamp the other of said parts releasably against said one part and to allow the rotation of said other part with said one part when the parts are clamped together, said clamp means including a bearing and means for selectively moving said bearing between extended and retracted positions relative to said mold, said other part including a pin extending axially into the said bearing and freely removable therefrom whereby the need for physically clamping said engageable edges together is avoided.

3,914,106
PROCESS FOR TREATING ORGANIC TEXTILES WITH FLAME RETARDANT POLYMERS MADE FROM HYDROXYMETHYLPHOSPHORUS COMPOUNDS AND GUANAZOLES

Leon H. Chance, New Orleans, La., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 215,409, Jan. 4, 1972, abandoned. This application Jan. 31, 1973, Ser. No. 328,205

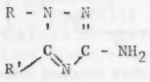
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] D06M *1/00*

U.S. Cl. 8—116 P **2 Claims**

1. A process for treating cellulosic material which comprises: phosphorous

a. treating said cellulosic material with an aqueous solution containing (i) a phosphorus compound selected from the group consisting of tetrakis(hydroxymethyl)phosphonium chloride, tris(hydroxymethyl) phosphine oxide, and tris(hydroxymethyl)phosphine and (ii) an aminotriazole selected from the group having the structure



wherein R may be H, NH_2 or an alkyl or aryl radical, and R' may be H or NH_2, the ratio of said phosphorous compound to aminotriazole being about from 1:0.25 to 1:1.5, and the pH of the solution being about from 2.8 to 9.5,

b. curing the treated material at temperatures ranging about from room temperature to 180° C for periods of time about from 1 minute to 18 hours, the longer periods of time being required for the lower temperatures, and

c. washing and drying the material.

3,914,107
CLEANSING BY LAUNDERING AND LIKE PROCESSES

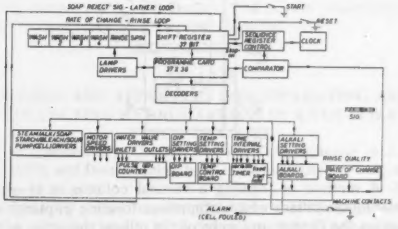
Christopher Ian Arthur Ellis, 30 Hill Road, Birkenhead, England

Filed June 20, 1973, Ser. No. 371,892

Claims priority, application United Kingdom, June 21, 1972, 28979/72

Int. Cl. D06f *33/02, 39/08*

U.S. Cl. 8—158 **9 Claims**



1. A method of cleansing by laundering and like processes of a load of materials and articles made from polyester-cotton, synthetic fibres, blends of synthetic fibres, and natural fibres which have been treated to impart a finish thereto, including the step of continuously sensing conditions during a cooling cycle of said process between the washing cycle and the rinsing cycle and controlling the progress thereof by reference to said conditions to obtain a graded and stepped cooling pattern, said step comprising continuously measuring the rate of cooling of the wash liquor and load and maintaining a predetermined rate of change, continuously monitoring the alkali and detergency values of said wash liquor and automatically introducing further alkali and detergent into said wash liquor in response to a reading below a predetermined value thereby to maintain the alkali and detergent concentration above said predetermined value, and continuously determining the level of said wash liquor within said vessel and adjusting it upon the addition of cooling water, alkali and detergent to maintain it at a predetermined level, the temperature, alkali and detergency monitors being operable to a temperature below the thermal barrier of the material and articles being laundered.

3,914,108
PROCESS FOR INCREASING RECEPTIVITY TO FLUORESCENT WHITENING AGENTS IN RESIN-TREATED CELLULOSIC TEXTILES

Ralph J. Berni, Metairie; Ruth R. Benerito, New Orleans, and Mary W. Pilkington, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Dec. 15, 1972, Ser. No. 315,731

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] D06P *3/00*

U.S. Cl. 8—185 **36 Claims**

1. An improvement process for imparting to cellulosic textiles the quality of receptivity to fluorescent whitening or brightening agents without destroying the natural or imparted physical properties of the textile, the process comprising:

a. providing sodium-cellulosate textile,

b. reacting the sodium-cellulosate textile of (a) with a tertiary butanol solution containing about from 2 to 7% glycidyltrimethylammonium chloride,

c. removing excess and unreacted glycidyltrimethylammonium chloride, and washing and drying the reacted textile,

d. reacting the cellulosic textile of (c) with an aqueous solution containing about from 6 to 20% of an N-methylolated resin selected from the group consisting of dimethyloldihydroxyethylene urea, dimethylolethylene urea, dimethylolpropylene urea, dimethylol-5-hydroxypropylene urea, dimethylolmethyl carbamate, and dimethylolethyl carbamate, and about from 0.3 to 2.0% of a Lewis acid type catalyst selected from the group consisting of zinc chloride, zinc fluoborate, zinc nitrate, magnesium chloride, and magnesium nitrate, and

e. drying and curing the reacted textile.

3,914,109
COTTON-OXIME, COTTON-SEMICARBAZONE, AND COTTON-HYDANTOIN-TEXTILE PRODUCTS OF HIGH NITROGEN CONTENT

Norman A. Portnoy, Parsippany, N.J.; Alden H. Reine, New Orleans, and Jett C. Arthur, Jr., Metairie, both of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 6, 1973, Ser. No. 348,558

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] D06P *3/00*

U.S. Cl. 8—194 **7 Claims**

2. A process for producing cellulose-oximes in the form of non-rigid textiles with high nitrogen content and good hand, the process comprising:

a. mixing 2 parts by weight of a fibrous cellulose-poly(-methyl vinyl ketone) copolymer with a solution containing about 20 parts by weight of ethanol, 5 parts by weight pyridine, and a quantity of hydroxylamine hydrochloride

equivalent to about 2.6 times the number of moles of ketone groups contained in the copolymer, and

b. refluxing the mixture of (a) at about 82°C. and 760 torr for about 2 hours to obtain quantitative yields of fibrous cellulose-oxime.

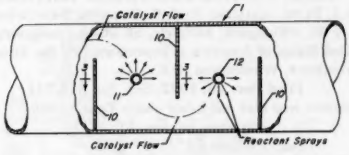
5. The fibrous cellulose-oxime produced by the process of claim **2**.

3,914,110

ALKYLATION REACTION COOLER

Robert F. Anderson, La Grange Park, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Feb. 19, 1974, Ser. No. 443,940
Int. Cl.[2] B01J *1/00, 8/08;* **C07C** *3/54*
U.S. Cl. 23—288 E **4 Claims**



1. An acid-catalyzed alkylation reaction cooler which comprises, in combination:

a. a horizontally-disposed, elongated chamber having internal heat removal means;

b. a catalyst inlet port at one end of said chamber and a reaction product outlet port at the opposite end of said chamber;

c. a plurality of reactant stream inlet ports disposed along said chamber between said catalyst inlet port and said reaction product outlet port;

d. a plurality of baffle means disposed in said chamber perpendicular to the longitudinal axis thereof, said baffle means having circular segment-shaped openings at alternate sides of said reaction chamber to thereby direct catalyst flow from side to side in serpentine fashion;

e. a plurality of closed-end tubes, vertically disposed within said chamber, each of which communicates with said chamber through one of said reactant stream inlet ports; and

f. each of said tubes having a multiplicity of spray nozzles, said spray nozzles being provided with means to project spray at directions having components perpendicular to and 180° against the direction of flow of said catalyst in the vicinity of said spray nozzles.

3,914,111

ALKYLATION REACTION CHAMBER

Robert F. Anderson, La Grange Park, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Apr. 18, 1974, Ser. No. 462,071
Int. Cl.[2] B01J *1/00, 8/08;* **C07C** *3/54*
U.S. Cl. 23—288 E **3 Claims**

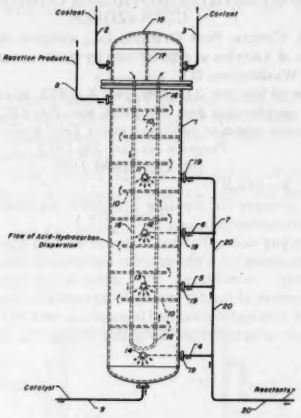
1. An acid-catalyzed alkylation reaction chamber which comprises, in combination:

a. a vertically-disposed, elongated cylindrical vessel having internal heat removal means;

b. an acid inlet port at the lower end of said vessel and a reaction product outlet port at the upper end of said vessel;

c. a plurality of vertically spaced reactant stream inlet ports disposed along said vessel between said acid inlet port and said reaction product outlet port;

d. a plurality of vertically spaced baffles within said vessel perpendicular to the longitudinal axis thereof, said baffles having circular segment-shaped openings at alternate sides of said vessel to provide a serpentine flow of liquid upwardly through the vessel; and



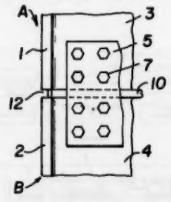
e. a plurality of reactant injection assemblies within said vessel, each disposed between a pair of adjacent baffles and communicating with one of said reactant stream inlet ports, said injection assemblies comprising downwardly directed spray nozzles.

3,914,112

METHOD FOR CONNECTING STEEL FRAME COLUMNS OR THE LIKE IN BUILDING CONSTRUCTION

Shohsuke Tsuruta, Yokohama; Hisao Toyoda, Tokyo; Shiroh Kashiwa, Tokyo; Takeshi Kawabata, Higashi-Yamato, and Yutaka Sumi, Tokyo, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 376,974, July 6, 1973, which is a continuation of Ser. No. 152,354, June 11, 1971, abandoned. This application June 21, 1974, Ser. No. 481,609
Int. Cl. B23k *31/08*
U.S. Cl. 29—155 C **3 Claims**



1. A method of forming a vertical column of H-section construction pillars which comprises forming coplanar surfaces on the flanges and webs of the pillars, the plane of said surfaces being perpendicular to the longitudinal axes of the pillars, erecting a lower pillar with its longitudinal axis substantially vertical, locating a flat spacer atop the lower pillar and on said surface of the web of that pillar, said spacer having a dimension in the horizontal direction parallel to the plane of the web at least equal to the length of the web between the flanges locating an upper pillar vertically atop the spacer and aligned with the lower pillar and supporting the weight of the upper pillar on the spacer, said locating step including positioning the spacer to form a welding groove for joining the upper and lower pillars said groove being defined by the said surfaces of said flanges of the pillars and a substantially verti-

cal surface of said spacer, said surface of said spacer being disposed in a plane normal to the plane of the webs of the pillars, and welding the beams and spacer together at the groove so formed by depositing weld material into said groove

---

3,914,113

TITANIUM CARBIDE PREPARATION

Shiu Tang Chiu, St. Lambert, Canada, assignor to Quebec Iron & Titanium Corporation Fer et titane du Quebec, Inc., Sorel, Canada

Division of Ser. No. 71,352, Sept. 11, 1970, Pat. No. 3,786,133. This application July 13, 1973, Ser. No. 378,893

Int. Cl.² B22F *3/00, 5/00, 7/00;* **C22C** *28/00*

U.S. Cl. 29—182.7 **2 Claims**

1. A titanium carbide-metallic matrix body wherein the metallic matrix is a secondary phase wherein titanium carbide is dispersed throughout the body as rounded particles from 0.01 mm to 0.5 mm in diameter, which matrix consists essentially of Fe-Al-Si mixture and comprises about 75% Fe, about 14% Si, and about 11% of Al, said matrix being substantially free of carbides of said Fe, Si, and Al.

3,914,114

CATALYTIC SUPPORTS

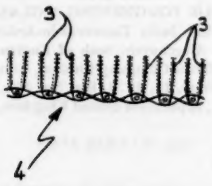
Andre Charmes, Lyon, France, assignor to Calinter S.A., Geneva, Switzerland

Filed June 1, 1973, Ser. No. 366,082

Claims priority, application France, June 1, 1972, 72.20204

Int. Cl.² B21F *21/00*

U.S. Cl. 29—183.5 **4 Claims**



1. A support including catalytic material for use in a burner, comprising a mat of metallic fiberous material forming a permeable surface backing, and a multiplicity of metal filaments mounted in and extending perpendicularly from the backing, the metallic fiberous material and the metal filaments having porous oxide surfaces, and said porous oxide surfaces being impregnated with catalytic material.

3,914,115

METHOD AND APPARATUS FOR SEPARATING AND COLLECTING HYDROCARBONS IN A VOLATILE VAPOR MIXTURE

George Parker, Sr., Corpus Christi, Tex., assignor to J. B. Trimble and Dwain Smith, both of Corpus Christi, Tex., part interest to each

Continuation of Ser. No. 404,232, Oct. 9, 1973, abandoned. This application June 3, 1974, Ser. No. 475,519The portion of the term of this patent subsequent to Dec. 18, 1990, has been disclaimed.

Int. Cl.² B01D *53/14*

U.S. Cl. 55—32 **9 Claims**

1. A method of controlling volatile petroleum emissions from a storage tank, comprising the steps of:

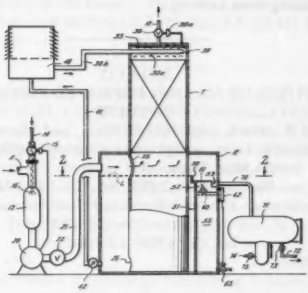
transporting petroleum vapors together with any water and air therewith by a low pressure blower to a packed tower;

regulating the pressure of the petroleum vapors in the storage tank by admitting air into the tank when the pressure drops below a predetermined amount related to atmospheric pressure, and by effecting said transporting of the petroleum vapors to the packed tower when the pressure in the tank exceeds a predetermined amount related to atmospheric pressure;

precooling a solution selected from the group consisting of brine and glycols prior to flow to said tower;

thereafter conducting said precooled solution to said tower and finely dispersing same for downward flow in said packed tower;

cooling said petroleum vapors and water therewith in said tower solely by said finely dispersed solution;



controlling the temperature of said solution so that it is low enough to condense a substantial portion of the hydrocarbons in said vapors;

causing any water with said petroleum vapors to go into solution with said solution;

separating any air from said petroleum vapors by the discharge of the air from the upper portion of said tower; and

separating said condensed hydrocarbons from said solution.

3,914,116

HIGH EFFICIENCY UNIT FILTER

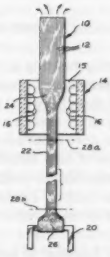
Karl L. Westlin, Louisville, Ky., assignor to American Air Filter Company, Inc., Louisville, Ky.

Continuation-in-part of Ser. No. 219,677, Jan. 21, 1972, abandoned. This application Oct. 24, 1973, Ser. No. 408,749

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B01D *46/52*

U.S. Cl. 55—500 **1 Claim**



1. A filter comprising: an open ended housing having an upstream dirty gas inlet and a downstream clean gas outlet, said housing having disposed therein a filter core which includes (a) a strip of filter medium folded upon itself at longitudinally spaced intervals to provide a plurality of stacked pleats within said housing extending between opposite walls thereof, and having successively alternating pleat fold turns; and (b) a plurality of corrugated thin metallic foil spacer members disposed within and extending along the flanks of said pleats

to space the same, said spacer members being laterally spaced from said pleat fold turns a distance equal to at least one-half the overall height of said spacer members, each of said spacer members being adhesively secured to said filter medium by at least two continuous one piece beads of adhesive, said adhesive in its uncured state having a viscosity in the range of 5,000–10,000 centipoises at a temperature of 85°F, said adhesive further being disposed across an exterior face of said filter core and in its cured state securing said spacer members thereto and providing horizontal and vertical stability to said filter core thereby preventing movement of said spacer element relative said filter pleats and to prevent said filter core and housing from racking.

3,914,117
METHOD OF MAKING IMPROVED FIBER OPTIC CONDUIT

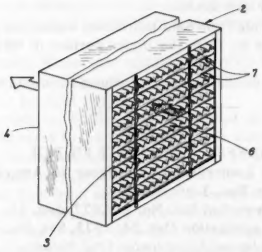
Richard R. Strack, Southbridge, Mass., and Merton L. Smith, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed May 10, 1973, Ser. No. 359,174

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C03C *23/20, 25/02*

U.S. Cl. 65—4 **6 Claims**



1. The method of making a drawn multifiber conduit including the steps of:

substantially uniformly heating a relatively large section of a bundle of juxtapositioned glass clad glass optical fibers having interstices therebetween to a temperature suitable for rapid drawing of at least a substantial portion of said section to the size desired of said multifiber conduit, said substantial portion of said heated section having a sufficient volume of materials to yield at least the entire length and diametral size desired of said conduit and said interstices being kept open adjacent opposite ends of said section of said bundle for free outgasing thereof continuously during said heating to said drawing temperature, said heated section of said bundle being disposed adjacent to a chilling atmosphere;

holding said bundle of fibers stationary, gripping one of its ends and drawing the heated section thereof rapidly longitudinally into said chilling atmosphere and to the length and cross-sectional size desired of said conduit, said rapidity of drawing being sufficient to substantially immediately quench said drawn conduit in said chilling atmosphere thereby avoiding appreciable interstitial and other internal gas bubble formations.

3,914,118
ANNEALING OF PATTERNED GLASS

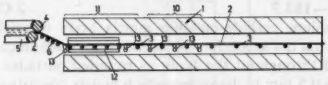
Peter Howard Brooke, Greasby; Ian James Dickinson; David Cecil Kavanagh, both of Wigan, and Colin Smith, Ashton-in-Makerfield, all of England, assignors to Pilkington Brothers Limited, England

Filed Aug. 9, 1974, Ser. No. 496,214

Claims priority, application United Kingdom, Aug. 13, 1973, 38278/73

Int. Cl.² C03B *13/08*

U.S. Cl. 65—95 **5 Claims**



1. A method of annealing a continuous ribbon of patterned glass having contiguous areas of thicker and thinner glass, wherein as the glass is cooled from its forming temperature to the lower end of the annealing range of temperature, the ribbon is advanced through a series of separated intensive reheating zones which are narrow in width in the direction of advance of the ribbon and in each of which the thinner areas of the ribbon are subjected to a greater reheating than the thicker areas so that the temperature gradient existing between the thicker and thinner areas of the glass is reduced on passing through each zone.

3,914,119
METHODS OF TOUGHENING A GLASS SHEET

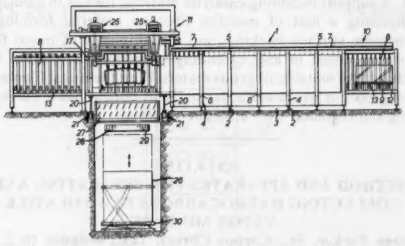
Harry Ross Scarlett Jack, Tanworth-in-Arden, and Arthur Joseph Nobbs, Alvechurch, both of England, assignors to Triplex Safety Glass Company Limited, London, England

Filed Mar. 12, 1974, Ser. No. 450,371

Claims priority, application United Kingdom, July 20, 1973, 34705/73

Int. Cl.² C03B *27/00*

U.S. Cl. 65—104 **25 Claims**



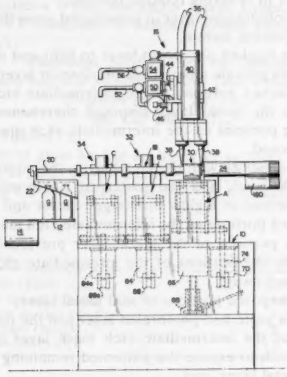
1. In a method of toughening a glass sheet wherein the glass sheet is heated to a predetermined temperature condition in which condition it can be bent, glass-bending dies are closed on to the sheet, those bending dies are retracted from the sheet, and the sheet is toughened by contacting its surfaces with a chilling medium, the improvement comprising:

after bending and prior to toughening of the bent sheet, controllably passing the bent glass sheet through a heating zone to establish sufficient residence of said sheet in the heating zone so as to heat the sheet substantially uniformly throughout its thickness to a pre-quenching temperature condition above the temperature at which it leaves the glass bending dies but at which the sheet remains bent for quenching the bent sheet.

3,914,120
INDIVIDUAL SECTION HIGH SPEED GLASSWARE FORMING MACHINE

Thomas Vincent Foster, Doncaster, England, assignor to Emhart Corporation, Farmington, Conn.

Filed Apr. 18, 1974, Ser. No. 462,078
Claims priority, application United Kingdom, Nov. 23, 1973, 54389/73
Int. Cl.² C03B 9/00
U.S. Cl. 65—229 26 Claims



1. A glassware forming machine section comprising a frame having means defining three operating stations for parison forming, further parison forming, and final shaping which are horizontally spaced apart longitudinally of the frame, the said means at the first such station including at least one upright top-opening blank or parison mold, mechanism supported over the frame and over said blank mold including guide means for introducing a gob of molten glass into the blank mold and also including a plunger and means for thrusting the plunger into the blank mold to form a parison from the gob of molten glass, the said means at the second of said stations including movable parts to engage and support a parison for further forming and to disengage and release the further formed parison, the said means at the third said station including a mold adapted to engage and support the further formed parison for final shaping to an article of glassware and to release the formed article, a head structure supported over the frame and over the last said mold and cooperating with that mold in the final shaping of the article by causing greater gas pressure within than without the further formed parison, and a transfer mechanism for parisons and finished articles including a horizontally movable carriage supported over the frame and means for reciprocating the carriage longitudinally of the frame between retracted and extended positions; the said carriage carrying a neck ring structure and first and second tong structures which in the retracted position of the carriage respectively engage parisons at the first, second and third stations, and in the extended position respectively release an initially formed parison at the second station, a further formed parison at the third station and a finally formed article beyond the third station.

3,914,121
SELECTIVELY HERBICIDAL 2-SUBSTITUTED -4H-3,1-BENZOXAZIN-4-ONES

William C. Doyle, Jr., Leawood, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Dec. 18, 1969, Ser. No. 886,403
Int. Cl.² A01N 9/12
U.S. Cl. 71—90 2 Claims

1. Combating weeds in the presence of crops by applying post-emergently to the locus of the weeds a herbicidally effective amount of 2-(2-thienyl)-4H-3,1-benzoxazin-4-one.

2. Combating weeds in the presence of crops by applying post-emergently to the locus of the weeds a herbicidally effective amount of 2-(4-methyl-1,2,3-thiadiazol-5-yl)-4H-3,1-benzoxazin-4-one.

3,914,122
HERBICIDAL COMPLEX AND FORMULATIONS THEREOF

Archibald Miller Hyson, Newark, Del., assignor to E.I. Du Pont de Nemours & Company, Wilmington, Del.

Division of Ser. No. 159,547, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 56,973, July 21, 1970, abandoned. This application Feb. 11, 1974, Ser. No. 441,215
Int. Cl.² A01N 9/22
U.S. Cl. 71—92 8 Claims

1. In a herbicidal formulation comprising 5-bromo-3-sec-butyl-6-methyluracil, 3-(3,4-dichlorophenyl)-1,1-dimethylurea and a suitable agricultural diluent, the improvement wherein 5-bromo-3-Sec-butyl-6-methyluracil and 3-(3,4-dichlorophenyl)-1,1-dimethylurea are present as a herbicidally effective amount of a 1:1 molar complex of 5-bromo-3-sec-butyl-6-methyluracil and 3-(3,4-dichlorophenyl)-1,1-dimethylurea and the formulation is physically stable.

3,914,123
SEGREGATION PROCESS FOR BENEFICIATING NICKEL, COPPER, OR COBALT OXIDIC ORE

Raymond John Davidson, Johannesburg, South Africa, assignor to Nilux Holding Societe Anonyme, Luxembourg

Filed Dec. 13, 1971, Ser. No. 207,272
Claims priority, application South Africa, Dec. 11, 1970, 70/8391; Apr. 8, 1971, 71/2269
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C22B 1/08
U.S. Cl. 75—1 4 Claims

1. In a method of beneficiating an oxidic ore or ore concentrate material containing silicate minerals and nickel, copper or cobalt by the segregation process comprising mixing the oxidic material with a halide salt and a reducing agent while at an elevated temperature; the improvement comprising adding ferrous or ferric oxide to the oxidic material to increase the active iron content of thereof and to form fayalite.

3,914,124
REDUCTION OF NICKEL OXIDE

Charles Edward O'Neill, Port Credit; Ramamritham Sridhar, Mississauga, and Malcolm Charles Evert Bell, Sudbury, all of Canada, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Mar. 29, 1974, Ser. No. 456,282
Claims priority, application Canada, Apr. 9, 1973, 168235
Int. Cl.² C22B 23/02
U.S. Cl. 75—82 48 Claims

1. A process for reducing and refining particles of a non-ferrous oxide of at least one metal selected from the group consisting of nickel or cobalt which comprises: establishing a moving bed of the non-ferrous metal oxide particles containing at least one volatile impurity selected from the group consisting of antimony, arsenic, bismuth, lead, selenium, sulfur, tellurium, tin, and zinc, the total volatile impurity content

exceeding about 0.005 percent and the sulfur content being between about 0.005 percent and 0.5 percent, and of at least one additive selected from the group consisting of calcium oxide, magnesia or compounds heat decomposable thereto, the additive being present in small but effective amounts to react with the non-ferrous oxide to form an antiagglomerating coating on a substantial portion of the particles to minimize sticking in the moving bed, and contacting the moving bed with a reducing atmosphere at a temperature high enough to reduce the non-ferrous oxide to metal and to lower the volatile impurity content.

3,914,125

DIFFUSION TRANSFER ELEMENT AND METHOD OF USING SAME

Tore Eikvar, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sept. 21, 1964, Ser. No. 397,986
Int. Cl. G03g *13/22;* **G03c** *5/54*
U.S. Cl. 96—1 E **15 Claims**

1. A sheet structure, suitable for printing photolithographically, comprising a base sheet having an organophilic surface, a tough hydrophilic layer coated over and firmly bonded to said organophilic surface, said hydrophilic layer being liquid permeable throughout its depth, and being characterized in becoming friable upon the in situ reduction therein of metal ions to their metallic state and subsequent removal of the reduction product, and a metal-ion reduction-promoter disposed at the inner surface of said hydrophilic layer, said hydrophilic layer being stabilized against undue reduction of metal ions passing therethrough prior to contacting the reduction-promoter at said inner surface, said hydrophilic layer, upon transfer therethrough in certain areas of metallic ions to said inner surface and into contact with said reduction promoter to become reduced to the metallic state, being readily broken cleanly away in said areas of such transfer to lay bare the underlying organophilic surface and define a printing image, while remaining hydrophilic and firmly bonded in the remaining areas.

3,914,126

NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS

Heinz W. Pinsler, Brighton, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 332,044, Feb. 12, 1973. This application Feb. 8, 1974, Ser. No. 440,907
Int. Cl.² G03G *5/04*
U.S. Cl. 96—1.5 **6 Claims**

1. A photoreceptor element comprising a nickel or nickel-coated substrate and a photoconductive layer joined in good blocking and charge-injection preventing contact with the substrate through at least two intermediate nickel oxide blocking layers arranged between the substrate and the photoconductive layer, obtained by the process comprising

microetching the nickel or nickel-coated substrate with an etching composition comprising an inorganic acid selected from the group consisting of phosphoric acid, sulfuric acid and hydrochloric acid, in the presence of at least one of palladium chloride, chloroplatinic acid, or ferric sulfate;

anodizing the resulting microetched chemically oxidized substrate; and

depositing a photoconductive layer upon the treated substrate to obtain the desired photoreceptor element.

3,914,127

METHOD OF MAKING CHARGE-COUPLED DEVICES

Dennis D. Buss, Richardson, and Alan R. Reinberg, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 23, 1973, Ser. No. 418,513
Int. Cl.² B44D *1/18;* **C23C** *15/00*
U.S. Cl. 96—36 **22 Claims**

1. A method of forming a device having a patterned metal layer and an insulating coating thereon, said method comprising:

forming a metal layer on a substrate,

depositing an intermediate etch mask layer on the metal layer in covering relation thereto,

depositing a layer of photoresist over the intermediate etch mask layer in covering relation thereto,

masking the photoresist layer in preselected areas thereof to define a pattern therein,

exposing the masked photoresit layer to light and developing same to provide a patterned photoresist layer overlying preselected portions of the intermediate etch mask layer and the metal layer disposed therebeneath, the remaining portions of the intermediate etch mask layer being exposed,

placing the substrate with the metal layer, the intermediate etch mask layer, and the patterned photoresist layer formed thereon in a glow discharge reactor and etching the exposed portions of the intermediate etch mask layer to expose portions of the metal layer previously being covered by the portions of the intermediate etch mask layer etched away,

etching the exposed portions of said metal layer,

removing the patterned photoresist layer and the remaining portions of the intermediate etch mask layer disposed therebeneath to expose the patterned remaining portion of said metal layer, and

forming within the glow discharge reactor by plasma deposition an insulating coating covering the remaining patterned portion of said metal layer and the substrate surface on which the remaining patterned portion of said metal layer is disposed.

8. A method of making a charge-coupled device, comprising:

providing a semiconductor wafer,

growing an oxide layer on one surface of said semiconductor wafer to provide a substrate,

forming a first metal layer on the oxide layer of said substrate to provide a metal-coating substrate,

placing said metal-coated substrate in a glow discharge reactor and etching the first metal layer in said reactor according to a predetermined pattern,

forming within the glow discharge reactor by plasma deposition an insulating coating covering the patterned etched first metal layer and the exposed surface of said substrate on which the patterned etched first metal layer is disposed,

removing the substrate with the patterned etched first metal layer and the insulating coating thereon from the glow discharge reactor, and

depositing a second metal layer on said insulating coating.

3,914,128

PHOTOHARDENABLE PASTE COMPOSITIONS HAVING HIGH RESOLUTION

David Hitz Scheiber, and Richard Vroman Weaver, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed June 8, 1973, Ser. No. 368,316
Int. Cl.² G03C *5/00, 7/00, 1/68*
U.S. Cl. 96—115 P **19 Claims**

1. A film forming photohardenable paste composition comprising from about 20 to about 75 weight percent of finely divided inorganic material capable on firing of being fused

into an element of an electronic circuit, from about 2 to about 35 weight percent of a polymeric binder, not more than about 10 weight percent of a photopolymerizable monomer, from about 0.02 to about 1 weight percent of an organic sensitizer, from about 20 to about 75 weight percent of a solvent, from about 0.01 to about 1.0 weight percent of a nitroso dimer having a dissociation constant in solution at 25°C. of from about 10^{-2} to about 10^{-10} with a rate of dissociation in solution with a half life comparable to the exposure time of the paste composition, and from about 0.05 to about 7.0 weight percent chromium present at either the free metal or an oxide thereof.

3,914,129
HIGH INDEX OPTICAL GLASS

James Matthew Wylot, and Edgar Joseph Greco, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 5, 1972, Ser. No. 286,499

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C03C *3/12*

U.S. Cl. 106—47 Q **1 Claim**

1. Optical glass having an index of refraction of approximately 1.912 and an Abbe number of approximately 19.6 and consisting of components having the following weight percents:

Component	Weight Percent
Lead Oxide (PbO)	64.7
Tellurium dioxide (TeO_2)	9.7
Germanium dioxide (GeO_2)	7.6
Sodium Oxide (Na_2O)	5
Silicon dioxide (SiO_2)	13.

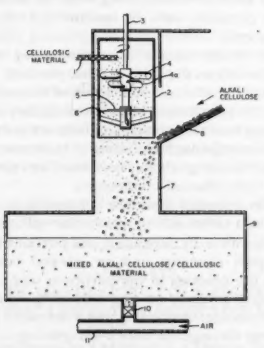
3,914,130
PROCESS FOR ADDING PARTICULATE CELLULOSE TO ALKALI CELLULOSE

Michael Paul Newcomer, Lawrence, Kans., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed May 8, 1974, Ser. No. 468,196

Int. Cl.² C08L *1/02, 1/24*

U.S. Cl. 106—163 **8 Claims**



1. In a process for the preparation of alkali cellulose comprising steeping cellulose pulp in an excess of caustic soda solution to produce alkali cellulose, removing excess caustic soda solution from the alkali cellulose, comminuting the alkali cellulose, adding at least one ball-milled cellulosic material selected from the group consisting of regenerated cellulose, wood pulp, wood pulp products, and nontree cellulosic material to the alkali cellulose to form a mixture thereof, and mechanically agitating the mixture, the improvement wherein the ball-milled material is added to the alkali cellulose by:

a. forming an air suspension, at atmospheric pressure, of ball-milled cellulosic material;

b. feeding comminuted alkali cellulose into the suspended cellulosic material to form an intimate mixture thereof; and

c. allowing the mixture to settle, whereupon the settled mixture is mechanically agitated.

3,914,131
USEFUL WAX COMPOSITIONS

Robert B. Hutchison, Cincinnati, Ohio, assignor to Emery Industries, Inc., Cincinnati, Ohio

Division of Ser. No. 174,252, Aug. 23, 1971, Pat. No. 3,745,033. This application Nov. 6, 1972, Ser. No. 303,702

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C08L *91/08*

U.S. Cl. 106—268 **3 Claims**

1. An aqueous emulsion containing about 20 to 60 percent by weight oil and 2 to 20 percent by weight of a wax composition comprising about 45 to 70 percent by weight, based on the wax composition, of (a) an α-alkyl branched monocarboxylic acid or mixture thereof, said acids containing from about 20 to about 60 carbon atoms with the alkyl group containing from about one to 16 carbon atoms;

about 15 to 40 percent by weight (b) mixed glycerides of saturated mono- and dicarboxylic acids selected from the group consisting of Japan wax and compositions obtained by the reaction of 1 to 4 mols monocarboxylic acid containing 14 to 20 carbon atoms, 0.25 to 1.5 mols short-chain dicarboxylic acid containing six to 12 carbon atoms and 1 mol glycerine; and

about 5 to 25 percent by weight of (c) microcrystalline petroleum wax melting between 180° and 200°F.

3,914,132
COMPOSITION AND PROCESS FOR THE REMOVAL OF ASPHALTENIC CONTAINING ORGANIC DEPOSITS FROM SURFACES

Gary D. Sutton, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 164,449, July 20, 1971, abandoned. This application May 14, 1973, Ser. No. 359,946

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C23G *5/02*

U.S. Cl. 134—40 **17 Claims**

1. A method for removing organic deposits containing asphaltenic compounds from surfaces which comprises contacting said deposits with a solvent consisting essentially of a hydrocarbon selected from the group consisting of benzene, toluene, and xylene and an amine selected from the group consisting of pyridine, morpholine, and primary, secondary and tertiary amines represented by the formula

wherein R, R′, and R″ are selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms, alkyl amine radicals having from 1 to 4 carbon atoms, cycloalkyl radicals having from 3 to 6 carbon atoms and mixtures thereof and, further, wherein said amine is present in said solution in an amount of from about 1 percent to about 50 percent by volume.

6. A method of removing organic deposits containing asphaltenic compounds from within oil production equipment comprising the steps of contacing said deposits within said equipment with a solvent consisting essentially of a hydrocarbon selected from the group consisting of benzene, toluene, and xylene, and an amine selected from the group consisting of pyridine and morpholine, and primary, secondary, and tertiary amines represented by the formula

wherein R, R′, and R″ are members of the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms, alkyl amine radicals having from 1 to 4 carbon atoms and cycloalkyl radicals having from 3 to 6 carbon atoms and mixtures thereof; and removing said solvent from said equipment after said deposits have been dissolved therein; wherein said amine is present in said solvent in an amount of from about 1 percent to about 35 percent by volume.

11. A solvent for asphaltenic-containing compounds, said solvent consisting essentially of a hydrocarbon selected from the group consisting of benzene, toluene, and xylene, and an amine selected from the group consisting of pyridine, diethylaminopropylamine, diethylamine, n-butylamine, dimethylaminopropylamine, ethylenediamine, and diethylenetriamine, wherein said amine is present in an amount of from 1 percent to about 35 percent by volume.

16. A method for removing organic deposits containing asphaltenic compounds from surfaces which comprises contacting said deposits with a solvent consisting essentially of a hydrocarbon selected from the group consisting of benzene, toluene, and xylene, and an amine represented by the general formula

wherein R, R′, and R″ are selected from the group consisting of hydrogen, alkyl radicals having from 1 to 4 carbon atoms, alkyl amine radicals having from 1 to 4 carbon atoms, and mixtures thereof wherein said amine has no more than 2 nitrogen atoms per molecule and there is no direct nitrogen-to-nitrogen bonding and further wherein said amine is present in said solution in an amount of from about 1 percent to about 35 percent by volume.

3,914,133

THERMAL BATTERY

Arlen R. Baldwin, and Thomas A. Reinhardt, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Energy Research & Development Administration, Washington, D.C.

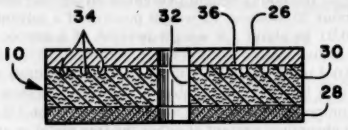
Filed Apr. 17, 1973, Ser. No. 351,926

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] H01M *4/36*

U.S. Cl. 136—83 T **8 Claims**

1. A thermal battery comprising a casing; a plurality of electrochemical cells stacked in said casing, each cell including an anode disc, an electrically conductive heat generating disc, and a normally solid fusible electrolyte disc sandwiched between said anode and heat generating discs in direct contact with said anode over a substantial portion of their adjacent surfaces, at least one of said anode and electrolyte discs being provided with depressed portions at interface between said anode and electrolyte discs and spaced radially inward from peripheral portions of said discs, the depressed portions being disposed circumferentially about the interface for trapping and inhibiting movement of molten materials, formed at said



interface during said battery operation, to peripheral edges of said cells; and means for igniting said heat generating discs.

3,914,134

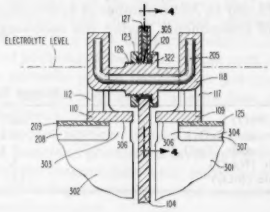
THROUGH-THE-PARTITION BATTERY CONNECTIONS

Charles Carson, Wyomissing, Pa., assignor to General Battery Corporation, Reading, Pa.

Filed Aug. 1, 1974, Ser. No. 493,672

Int. Cl. H01m *5/00*

U.S. Cl. 136—134 R **8 Claims**



1. A storage battery comprising:

a casing having a plurality of cell cavities defined by the walls of said casing and integral partition walls therein, said cell cavities being configured for containment of battery electrode plates and electrolyte fluid, said partition walls each defining at least one opening between partitions and above the tops of said plates for passage through the partition wall of intercell connectors, said openings each communicating with the tops of their respective partition walls by means of a channel in the partition wall;

conductive straps respectively connecting the positive plates of a cell on the side of a first partition wall and the negative plates of a cell on the side of the same cell opposite said first partition wall, the orientation of said straps alternating from cell to cell facilitate series connection of cells, said straps each including at least one upward post element extending above associated openings, for connection with intercell connectors;

at least one intercell connector between associated post elements on either side of a partition wall, said connector having downwardly depending end portions from the tops of the post elements and an integral central portion through the opening in the partition, said connector incorporating a flange on one side of the partition wider than the associated opening and a threaded portion from said flange through the associated opening to the opposite side of the associated partition wall;

a spacer between said flange and the associated partition wall;

a washer-nut, wider than the associated opening, tightened on said threaded portion against the partition wall on the side opposite said flange; and

a sealant applied through said channel to fill a void around the central portion of said connector formed by said flanges, said spacer, and said nut.

3,914,135
METHOD OF IMPROVING STEEL PROPERTIES BY USING CONTROLLED COOLING RATES

Isao Kozasu, and Teruhiko Shimizu, both of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1973, Ser. No. 340,942

Claims priority, application Japan, Mar. 15, 1972, 47-25801

Int. Cl. C21d *1/18*

U.S. Cl. 148—144 **8 Claims**

1. The method of preparing an improved steel material which includes the steps of:

i. preparing a steel consisting essentially of

0 – 0.25% C

0.6 – 2.0% Mn

0.01 – 0.10% Sol.Al

0.01 – 0.20% Nb or less than 0.20% (Nb+V)

ii. heating the steel of step (i) from Ac_3 point to 1000°C, and iii. cooling said heated steel at a rate of 0.30° to 2.0°C per second, until its transformation is completed, at a selected rate which yields a product substantially free from martensite having high yield strength, and excellent toughness.

3,914,136
METHOD OF MAKING A TRANSMISSION PHOTOCATHODE DEVICE

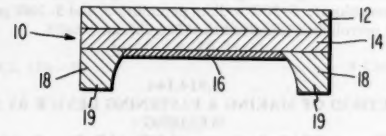
Henry Kressel, Elizabeth, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 27, 1972, Ser. No. 309,756

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H01L *7/36, 7/38*

U.S. Cl. 148—171 **4 Claims**



1. The method for making a transmission photocathode device comprising the steps of:

a. epitaxially growing a first layer of a P type semiconductor material on a substrate of the same semiconductor material as that of the first layer; b. epitaxially growing a second semiconductor layer upon said P type first layer, said second semiconductor layer being of a P type semiconductor material having a higher bandgap energy than the semiconductor material of said P type first layer;

c. removing said substrate to expose said P type first layer; and

d. coating said exposed P type first layer with a workfunction-reducing activation layer.

3,914,137
METHOD OF MANUFACTURING A LIGHT COUPLED MONOLITHIC CIRCUIT BY SELECTIVE EPITAXIAL DEPOSITION

Tommie R. Huffman, and Michael G. Coleman, both of Tempe, Ariz., assignors to Motorola Inc., Chicago, Ill.

Division of Ser. No. 186,883, Oct. 6, 1971, abandoned. This application Nov. 2, 1973, Ser. No. 412,083

Int. Cl.² H01L *7/36*

U.S. Cl. 148—175 **7 Claims**

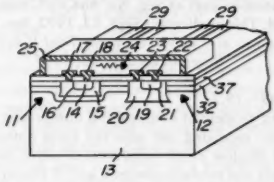
1. A process for the manufacture of a monolithic integrated circuit comprising the steps of:

a. growing a first monocrystalline semiconductor filling through a first dielectric layer on a monocrystalline substrate selected from the group consisting of germanium, silicon, and semiconductor grade III-V compounds;

b. depositing a second dielectric layer over said first monocrystalline filling;

c. growing a second monocrystalline semiconductor filling through first and second dielectric layers from said monocrystalline substrate;

d. depositing a carrier substrate over said second dielectric layer and said second monocrystalline filling;



e. removing said monocrystalline substrate and exposing said first and second monocrystalline fillings;

f. diffusing a conductivity effecting material into one of said monocrystalline fillings to produce a light emitting semiconductor junction; and

g. diffusing a conductivity effecting material into the other of said monocrystalline fillings to produce a light detecting junction.

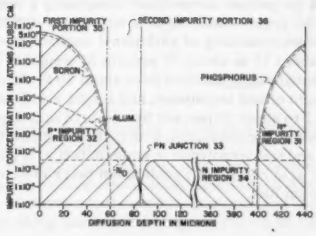
3,914,138
METHOD OF MAKING SEMICONDUCTOR DEVICES BY SINGLE STEP DIFFUSION

Prosenjit Rai-Choudhury, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 16, 1974, Ser. No. 498,016

Int. Cl.² H01L *7/34*

U.S. Cl. 148—186 **32 Claims**



1. A method of making a semiconductor device comprising the steps of:

A. contacting volatizable organic films carrying impurity diffusion material to opposed major surfaces of at least one doped semiconductor body in an open-tube diffusion furnace, with the films contacting the opposed major surfaces of each semiconductor body alternately carrying N-type and P-type impurity diffusion materials;

B. heating the diffusion furnace to a temperature higher than about 1,000°C to volatilize the organic films and to diffuse the N and P-type impurities simultaneously into the respective opposed major surfaces of the semiconductor body to form at least one PN junction therein;

C. slowly cooling the semiconductor body to a temperature between about 550° and 800°C at a rate less than about 3°C per minute; and

D. thereafter rapidly cooling the semiconductor body from said temperature to below about 300°C at a rate greater than about 25°C per minute.

3,914,139

PROPELLANT WITH VERY HIGH BURNING RATE ACRYLATE POLYMER BINDER AND NF PLASTICIZER

Marvin L. Jones, Cumberland, Md., and David W. Booth, Gurley, Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 866,067, Sept. 30, 1969, abandoned. This application Sept. 12, 1972, Ser. No. 287,164

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C06D *5/06*

U.S. Cl. 149—19.2 **7 Claims**

1. A solid propellant composition comprising: a mixture of an inorganic oxidizing salt selected from ammonium, alkali metal, and alkaline earth metal salts of nitric, perchloric, and chloric acids and mixtures thereof; an NF binder comprised of the plasticizer 1,2,3-tris(1,2-bis-difluoramino) ethoxy propane in combination with a material selected from a terpolymer of 2,3-bis(difluoramino) propyl acrylate, carboranyl methyl acrylate, and acrylic acid, or a copolymer of ethyl acrylate and acrylic acid with the added plasticizer, 1-isopropenylcarboranyl-acetone; and a dicyclo diepoxy carboxylate curing agent.

3,914,140

PROPELLANT WITH MIXED CARBOXYL POLYBUTADIENE AND CARBORANYL METHACRYLATE-BUTADIENE-ACRYLIC ACID TERPOLYMER AS BINDER

Chester W. Huskins, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 30, 1970, Ser. No. 24,017

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C06D *5/06*

U.S. Cl. 149—19.2 **7 Claims**

1. A propellant composition comprising a binder selected from the group consisting of a terpolymer constituted of the monomers consisting of carboranyl methacrylate in amounts from about 15 to about 75 percent by weight of said terpolymer, butadiene in amounts from about 10 to about 80 percent by weight of said terpolymer, and acrylic acid in amounts from about 2 to about 20 percent by weight of said terpolymer, said terpolymer in combination with carboxy-terminated polybutadiene and said terpolymer in combination with polybutadiene-acrylic acid copolymer; ammonium perchlorate oxidizer; and aluminum fuel.

3,914,141

PROPELLANT WITH ACRYLATE COPOLYMER BINDER AND BUTANETRIOL TRINITRATE PLASTICIZER

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 24, 1970, Ser. No. 64,868

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C06D *5/06*

U.S. Cl. 149—19.3 **9 Claims**

4. A propellant composition comprising a binder of ethyl acrylate-acrylic acid copolymer; a curing agent of diepoxydicyclohexyl carboxylate; butanetriol trinitrate; and organic oxidizer selected from cyclotetramethylenetetranitramine and cyclotrimethylenetrinitramine; 1,2,3-tris [1,2-bis(difluoramino)-ethoxy]propane; and carbon black additive.

3,914,142

SOLID PROPELLANTS WITH BIRADICAL BURNING RATE CATALYSTS

David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 1, 1970, Ser. No. 78,331

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C06D *5/06*

U.S. Cl. 149—19.8 **8 Claims**

1. A solid propellant composition comprising a binder, an oxidizer, a burning rate catalyst selected from the biradical compounds consisting of p, p'-biphenylene-bis(diphenylmethyl) and p, p'-phenylene-bis(diphenylmethyl), and a crosslinking agent.

3,914,143

PHOTOFLASH LAMP PRIMER COMPOSITION

Vaughn C. Sterling, Cleveland, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 315,663, Dec. 15, 1972. This application July 11, 1974, Ser. No. 487,776

Int. Cl.[2] C06B *33/12*

U.S. Cl. 149—40 **2 Claims**

1. A stabilized liquid suspension of primer material which comprises an aqueous solution of polyvinyl pyrrolidone binder having suspended therein a solid mixture containing 1–5% sodium chlorate and 1–6% sodium perchlorate as dissolved solids in said solution, and the balance being zirconium by weight of said solid mixture.

2. A primer coating composition for a flash lamp which comprises an admixture of a liquid suspension containing in weight percent 68–80% zirconium, 20–35% water, 0–5% colloidal silica and 0–2% polyvinyl alcohol with a liquid solution containing in weight percent 45–75% water, 5–25% sodium chlorate, 5–30% sodium perchlorate, and 5–20% polyvinyl pyrrolidone dissolved in said solution.

3,914,144

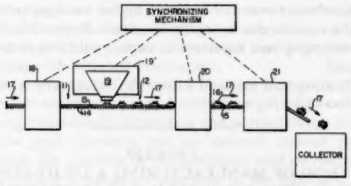
METHOD OF MAKING A FASTENING DEVICE BY SPIN WELDING

William A. Ribich, Lexington, and David B. Russell, Ashland, both of Mass., assignors to American Velcro, Inc., New York, N.Y.

Division of Ser. No. 112,353, Feb. 3, 1971, Pat. No. 3,851,357. This application May 9, 1974, Ser. No. 468,505

Int. Cl.[2] B32B *31/16*

U.S. Cl. 156—73.5 **4 Claims**



1. A method of making a fastening device comprising the steps of:

a. taking a tape fastening member having:

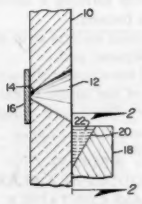
1. a flexible base element; and
2. a multiplicity of flexible resilient hooking elements projecting from one surface of the base element and adapted to be secured to a surface having complementary hooking elements by pressing opposed hooking elements and complementary hooking elements together in face-to-face relation;

b. incrementally advancing said tape fastening member along a longitudinal path;
c. taking a snap fastening member including:
1. a flexible base member of a heat meltable plastic material having at least two meltable concentric ridges extending upwardly from one surface thereof; and
2. holding means protruding from one surface of the base member for securing the snap fastening member to a mounting plate;
d. placing said snap fastening member in engaging relation with said incrementally advancing tape fastening member with the surface of the snap fastening member having said concentric meltable ridges in face-to-face relation with the surface of the base element of said tape fastening member opposite to the surface from which the multiplicity of hooking elements extend;
e. spinning the snap fastening member relative to the tape fastening member while simultaneously pressing said snap fastening member and tape fastening member together sufficient to create frictional heat sufficient to form a molten film at least along the concentric ridges of the snap fastening member and between contacting portions of the tape fastening member an the snap fastening member;
f. terminating said spinning action of said snap fastening member relative to said tape fastening member; and
g. permitting said molten film created by said frictional heat to cool and solidify to thereby produce an intergral melt bond between said tape fastening member and said snap fastening member without distortion thereof.

3,914,145
METHOD AND APPARATUS FOR REPAIRING CRACKS IN PLATE GLASS

C. Richard Forler, Littleton, and Conrad F. Heins, Denver, both of Colo., assignors to The Glass Doctor, Inc., Carrollton, Tex.

Filed June 11, 1973, Ser. No. 368,637
Int. Cl.² B32B *35/00*
U.S. Cl. 156—98 9 Claims



1. Method of repairing an installed substantially vertical integral transparent plate glass panel, said panel having first and second spaced parallel planar surfaces without lamination reinforcement therebetween and a generally conical cavity therebetween formed by a broken-out piece of glass of like shape, the base of the cone being in the plane of the first surface and the apex thereof being disposed adjacent the second surface, comprising:
a. removing loose particles of glass, if any, from the cavity through the base thereof,
b. applying a readily manually removable closure having a flat surface to the first surface contiguous with the base of the cone and a surrounding portion of the first surface;
c. delivering a transparent liquid prepolymer, first to the lower portion of the cavity, whereby the liquid level therein may rise and displace air therebelow;
d. venting air above the liquid level from the uppermost portion of the cavity, whereby all air in the cavity is vented therefrom when the liquid level reaches the uppermost portion of the cavity;
e. causing the liquid to polymerize into a solid conical plug; and
f. removing the closure and surplus material on the first surface in the locus around the base of the cone.

3,914,146
POLYESTER HOSE AND PREPARATION THEREOF

Robert B. Koch, Reading, Pa., assignor to Rilsan Corporation, Glen Rock, N.J.

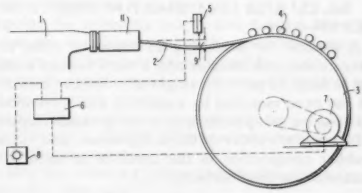
Filed Feb. 19, 1974, Ser. No. 443,452The portion of the term of this patent subsequent to Jan. 22, 1992, has been disclaimed.
Int. Cl.² B29D *23/00*
U.S. Cl. 156—149 32 Claims

1. A process for the preparation of a reinforced hose construction which comprises contacting a polyester tubing with a solution of an organic material selected from the group consisting of resorcinol, catechol, glutaric acid and naphtho resorcinol, or a mixture thereof, drying said solution to form a crystalline material on the surface of said tubing, reinforcing said tubing with at least one layer of a synthetic or natural fiber followed by subjecting the reinforced tubing thus obtained to a temperature of at least about 150°F.

3,914,147
APPARATUS AND METHOD FOR THE CONTINUOUS PRODUCTION OF WOUND PIPES

Michael Wienand; Klaus Jensen, both of Siegburg; Franz Primessing, Niederkassel-Mondorf, and Franz-Werner Alfter, Siegburg, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed May 4, 1973, Ser. No. 357,089
Claims priority, application Germany, May 4, 1972, 2221727
Int. Cl.² B65H *81/00*; B29C *19/00*
U.S. Cl. 156—195 17 Claims



1. Apparatus for manufacturing wound pipes comprising:
a rotatable winding drum;
extruding means for continuously supplying a profiled strip to a winding surface of said drum, said profiled strip being formed of thermoplastic resinous material and including a tongue along one edge and a groove along an opposite edge;
drum drive means for rotatably driving said drum;
strip guide means for guiding said profiled strip onto said winding surface with successive windings of said strip extending in a spiral manner in close proximity to one another, the tongue of one winding being engageable in the groove of the next successive winding, said guide means including pressure rollers engageable with at least one of said groove and tongue of said profiled strip;
joining means for joining said successive windings to one another to form a pipe from said profiled strip, said pressure rollers also serving as part of said joining means, and said joining means including means for thermoplastically joining said windings along said tongue and groove including means for heating said profiled strip in the area of said pressure rollers such that successive windings of said profiled strip are joined to one another in the area of said pressure rollers;

drum drive control means for controlling the speed which said drum drive means rotatably drives said drum as a function of the extrusion speed of the profiled strip being supplied by said extrusion means; and

cooling unit means arranged after said pressure rollers with respect to the path of said profiled strip for cooling the joined windings.

3,914,148

BONDING METALS TO ELASTOMER SYSTEMS UTILIZING NITROGENOUS TREATED FURNACE BLACKS

Peter Aboytes, Borger, Tex., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 90,810, Nov. 18, 1970, Pat. No. 3,676,256. This application May 8, 1972, Ser. No. 251,109

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B32B *15/06;* **B44D** *1/34;* **C08C** *11/18*

U.S. Cl. 156—306 **1 Claim**

1. A method for producing an improved adhesive bond between rubber vulcanizates and a brass surface comprising adding at least 10 parts by weight of a furnace carbon black which has been oxidized with a nitrogenous oxidizing agent per 100 parts of rubber in the composition, and vulcanizing the rubber composition in the presence of sulfur while in contact with the brass surface.

3,914,149

BONDING METALS TO ELASTOMER SYSTEMS UTILIZING HALOGEN TREATED FURNACE BLACKS

Peter Aboytes, Borger, Tex., assignor to J. M. Huber Corporation, Locust, N.J.

Continuation-in-part of Ser. No. 90,810, Nov. 18, 1970, Pat. No. 3,676,256. This application May 8, 1972, Ser. No. 251,635

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B32B *15/06;* **B44D** *1/34;* **C08C** *11/18*

U.S. Cl. 156—306 **1 Claim**

1. A method for producing an improved adhesive bond between rubber vulcanizates and a brass surface comprising adding at least 10 parts by weight of a furnace carbon black which has been modified by treatment with a compound selected from the group consisting of halogens and oxyhalogens, per 100 parts of rubber in the composition, and vulcanizing the rubber composition in the presence of sulfur while in contact with the brass surface.

3,914,150

COPOLYAMIDE-SOLVENT SYSTEMS

Harold Wayne Hill, Jr., and Robert W. Campbell, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 269,096, July 5, 1972, Pat. No. 3,817,903. This application May 20, 1974, Ser. No. 471,819

Int. Cl.² C09J *5/02*

U.S. Cl. 156—308 **10 Claims**

1. A process for the solvent welding of articles formed from a copolyamide comprising the reaction product of (a) one of bis(4-aminocyclohexyl)methane and methyl derivatives thereof, (b) a phenylindanedicarboxylic acid or alkyl derivative thereof wherein the alkyl group contains from 1 to 3, inclusive, carbon atoms, and (c) a straight chain dicarboxylic acid having from 6 to 18, inclusive, carbon atoms per molecule, wherein the molar ratio of (a) to the total of (b) and (c) is approximately 1:1 and (c) constitutes up to 85 mole percent of the total of (b) and (c), which comprises contacting the copolyamide articles at the surfaces to be joined with a solvent system consisting essentially of a mixture of (d) an alcohol selected from methanol, ethanol and mixtures thereof and (e) a chlorocarbon selected from chloroform, methylene chloride, carbon tetrachloride, trichloroethylene, 1,1,2-trichloroethane, 1,1,2,2-tetrachloroethane, and mixtures thereof, and then pressing the solvent softened portions into contact and allowing solvent to evaporate and weld the copolyamide articles together.

3,914,151

MANDREL FOR THE PRODUCTION OF REINFORCED PLASTIC TUBING

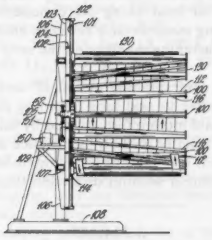
Peder Ulrik Poulsen, Fredensborg, Denmark, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 271,309, July 13, 1972, Pat. No. 3,861,984. This application May 28, 1974, Ser. No. 473,607

Claims priority, application Denmark, Nov. 2, 1971, 5344/71

Int. Cl.² B65H *81/00*

U.S. Cl. 156—425 **7 Claims**



1. A mandrel for the production of tubing, comprising:

a hollow core including a plurality of parallel elongated members spaced equidistantly from each other about the circumference of a circle and slideably mounted on a common headplate;

an endless strip wound helically around said core in a direction away from the headplate and extending back through the interior of the core, successive convolutions of the helically wound strip forming a continuous surface on which the tubing is formed;

means for advancing said endless strip along a helical path away from the headplate; and

adjustment means for simultaneously moving said elongated members radially of the circle equal distances when a change in diameter of said core is desired.

3,914,152

MACHINE FOR PRODUCING A PLASTIC-COVERED GLASS CONTAINER

Stephen W. Amberg, St. James; Thomas E. Doherty, Setauket, both of N.Y., and Clarence A. Heyne, Sun City, Ariz., assignors to Owens-Illinois, Inc., Toledo, Ohio

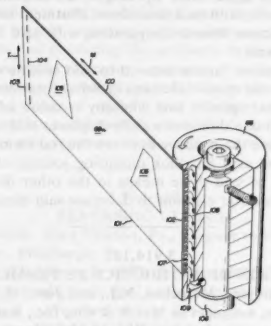
Division of Ser. No. 209,751, Dec. 20, 1971, Pat. No. 3,802,942. This application July 10, 1973, Ser. No. 378,001

Int. Cl.² B31F *9/00*

U.S. Cl. 156—446 **11 Claims**

1. A mandrel turret for forming lengths of sheet-like material into sleeves comprising a base, a turret rotatable on said base, plural mandrel mechanism rotatably mounted at spaced-apart, equal radius positions on said turret for movement in a circular path with the turret, each mandrel mechanism comprising a mandrel adapted for rotation about its central axis and having a curved peripheral surface, axially disposed vacuum applying ports on said surface operable for attaching the length of material thereon, means defining a passageway through said mandrel connected with said ports, a vacuum source, vacuum control means on said turret, an annular manifold non-rotatably mounted on said base, means connecting the vacuum source to said manifold, said manifold defining a chamber having a circular slot facing parallel to the axis of

the turret and coextensive with a portion of the circular path of the turret, an orifice plate on said turret and rotatable in communication with said slot in said portion of the circular path, said orifice plate being connected individually to said passageway of each mandrel, means connecting said vacuum



control means to each of said passageways, the vacuum being applied to each mandrel during rotary movement of the orifice plate over said manifold slot, and means engaging said mandrel mechanism during portions of the rotary movement of said turret and rotating the mandrels about their central axes during turret rotational movement.

3,914,153

METHOD OF AND APPARATUS FOR FUSION-BONDING THERMOPLASTIC TAPE IN STRAPPING MACHINE

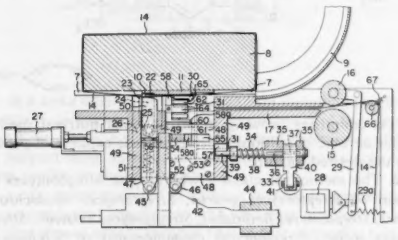
Eiichi Sato, Hayama, Japan, assignor to Ogawa Hoso System Kabushiki Kaisha, Kodaira, Japan

Filed Dec. 18, 1973, Ser. No. 425,868

Claims priority, application Japan, Dec. 19, 1972, 47-128004

Int. Cl.² B65B *13/32*; B32B *31/20*

U.S. Cl. 156—499 **1 Claim**



1. A device for fusion bonding together the overlapping portions of a thermoplastic strapping tape disposed around an article comprising means for clamping together the leading end of said tape and the overlapping trailing portion thereof in a fixed position with respect to the article, means for heating the overlapping portions of the tape to the fusion temperature of said thermoplastic tape, means for inserting said heating means between the overlapping portions of the tape adjacent the clamping means, means for exerting pressure against the overlapping portions of the tape along a line transversely of said portions of the tape and disposed between the clamping means and said heating means when said heating means is inserted between the overlapping portions of the tape, means for cutting the outer trailing portion of the tape to provide a trailing end of the tape, and means for moving said heating means and said pressure exerting means simultaneously longitudinally of said tape toward the trailing end of said tape whereby the overlapping portions of the tape are progressively heated and substantially immediately thereafter pressed together to form a secure bond between the overlapping portions of the tape.

3,914,154

METHOD AND DEVICE FOR THE PRODUCTION OF LAYERED PRESSED PANELS

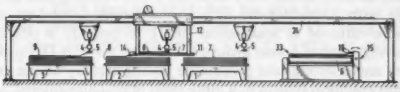
Heinrich Pfeiffer, Eppingen, Germany, assignor to Maschinenfabrik J. Dieffenbacher & Co., Eppingen, Germany

Filed June 10, 1974, Ser. No. 477,993

Claims priority, application Germany, June 8, 1973, 2329267

Int. Cl.² B32B *31/00*; B65H *5/08*

U.S. Cl. 156—557 **15 Claims**



1. A method of assembling a plurality of layers from separate layer stacks into a layer package for the production of layered pressed panels, like veneer panels, chipboard panels, fiber panels, plastic panels, metal panels, plywood panels, and the like, in a panel press, the method comprising the steps of:

lifting the uppermost layer from each of several separate layer stacks;

approaching a collecting palette horizontally against the first layer stack;

advancing the collecting palette in between the raised layer and said first layer stack, until it is positioned underneath said layer;

releasing the raised layer onto the collecting palette;

approaching the collecting palette with said first layer against the second layer stack;

advancing the collecting palette and the first layer in between the raised layer and said second layer stack, until they are positioned underneath said layer;

releasing the raised second layer onto said first layer on top of the collecting palette;

similarly picking up the uppermost layer from each remaining layer stack, thereby forming a layer package on top of the collecting palette;

returning the collecting palette with the layer package to an assembly table; and

depositing the layer package onto the assembly table by holding the package by one of its edges and sliding the collecting palette out from under the package.

3,914,155

POLYAMIDE/FORMALDEHYDE/EPICHLOROHYDRIN WET STRENGTH RESINS AND USE THEREOF IN PRODUCTION OF WET STRENGTH PAPER

Frederic Horowitz, Atlanta, Ga., assignor to Georgia-Pacific Corporation, Portland, Oreg.

Continuation of Ser. No. 287,014, Sept. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 54,658, July 13, 1970, abandoned. This application May 22, 1974, Ser. No. 472,496

Int. Cl.² C08G *12/04*; D21H *3/52*

U.S. Cl. 162—167 **10 Claims**

1. A process for providing a wet strength resin comprising forming a polyamide having secondary amine groups by reacting a polyalkylene polyamine having two primary amine groups and one to three secondary amine groups with a dicarboxylic acid selected from the group consisting of diglycolic acid and C_3 to C_8 saturated aliphatic dicarboxylic acids in a mole ratio of polyamine: dicarboxylic acid of from about 0.8:1 to about 1.4:1; reacting said polyamide with formaldehyde in

a formaldehyde:secondary amine mole ratio of at least about 0.5:1 to provide a polyamide having tertiary amine groups containing a $—CH_2OH$ substituent, reacting said polyamide with epichlorohydrin in a mole ratio of epichlorohydrin: amine of from 1:1 to about 2.5:1 to form a water-soluble cationic thermosetting resin characterized by a viscosity of at least about 30 cps for a 10% solids solution at 25°C.

6. A process for providing a wet strength paper containing cellulosic fibers comprising incorporating into the paper from about 0.2 to about 3 percent, based on the dry weight of the fibers, a resin prepared by forming a polyamide having secondary amine groups by reacting a polyalkylene polyamine having two primary amine groups and one to three secondary amine groups with a dicarboxylic acid selected from the group consisting of diglycolic acid and C_3 to C_8 saturated aliphatic dicarboxylic acids in a mole ratio of polyamine:dicarboxylic acid of from about 0.8:1 to about 1.4:1, reacting said polyamide with formaldehyde in a formaldehyde:secondary amine mole ratio of at least about 0.5:1 to provide a polyamide having tertiary amine groups containing a $—CH_2OH$ substituent and reacting said polyamide having tertiary amine groups with epichlorohydrin in a mole ratio of epichlorohydrin:amine of about 1:1 to 2.5:1 to form a water-soluble cationic thermosetting resin characterized by a viscosity of at least about 30 cps for a 10% solid solution at 25°C, and subjecting the resin to heat to provide a thermoset resin.

3,914,156

PAPERMAKING MACHINE HEADBOX SLICE OPENING ADJUSTING SCREWS

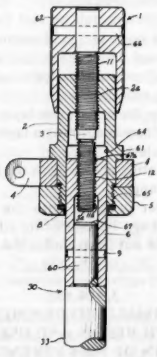
Kenneth Ray Batcher, Cumberland, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Aug. 29, 1973, Ser. No. 392,732

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² D21F 1/02

U.S. Cl. 162—347 **5 Claims**



1. An apparatus for adjusting the separation distance between upper and lower slice lips of a paper machine headbox, said upper slice lip being pivotally secured to said headbox, said apparatus comprising:

a rod element pivotally secured at one end thereof to said upper slice lip for movement about an axis parallel with said upper slice lip length, the other end of said rod provided with first and second abutment surfaces and a first screw thread having a first thread lead disposed about the axis of said rod element;

an axially extended spindle element having at one end thereof an abutment surface cooperative with said first rod abutment surface and a second screw thread cooperatively engageable with said first screw thread disposed about the axis of said spindle, the other end of said spindle element provided with a third screw thread having a second thread lead disposed about said spindle axis;

a headbox mounting element having a journal element for pivotal attachment to said headbox about an axis parallel with said upper slice lip length, an abutment surface cooperative with said second rod abutment surface and a fourth screw thread cooperative with said third screw thread; and

rotational drive means secured to said spindle element for turning said spindle element in either rotational direction about said spindle axis whereby rotation of said drive means in one direction axially displaces said rod element to increase the distance between the rod element slice lip pivot and said headbox mounting journal element and rotation of said drive means in the other direction displaces said rod element to decrease said distance.

3,914,157

PREPARATION OF ANTIBIOTICS BY FERMENTATION

Edward O. Stapley, Metuchen, N.J., and Justo M. Mata, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

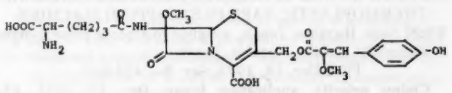
Continuation-in-part of Ser. Nos. 19,496, March 13, 1970, abandoned, and Ser. No. 51,319, June 30, 1970, abandoned, and Ser. No. 203,896, Dec. 1, 1971. This application Feb. 12, 1973, Ser. No. 331,417

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

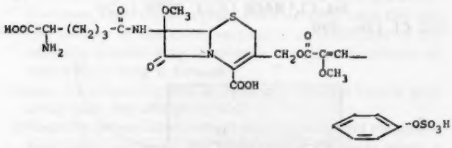
Int. Cl.² C12D 9/00

U.S. Cl. 195—80 R **6 Claims**

1. A method for the preparation of a mixture of antibiotics having the following formulas:



and



which comprises growing in an aqueous nutrient medium under aerobic conditions a Streptomyces capable of producing the desired mixture.

2. The method of claim **1** wherein the Streptomyces is a strain of *Streptomyces griseus*, *Streptomyces viridochromogenes*, *Streptomyces fimbriatus*, *Streptomyces halstedii*, *Streptomyces rochei*, *Streptomyces cinnamonensis* or *Streptomyces chartreusis*.

3,914,158

ANTIBIOTIC PRODUCTION

Edward O. Stapley, Metuchen, N.J., and Justo M. Mata, Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Filed June 6, 1973, Ser. No. 367,661

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C12D 9/00

U.S. Cl. 195—80 R **10 Claims**

1. A method of producing an antibiotic mixture comprised of cephamycin C and toyocamycin which method comprises cultivating a cephamycin C and toyocamycin producing strain of *Streptomyces albogriseolus* in a culture medium containing assimilable sources of carbon and nitrogen under aerobic conditions until a substantial amount of said antibiotics are produced by said organism in the culture medium.

2. The method of claim **1** wherein the organism is *Streptomyces albogriseolus* NRRL 5735.

5. A method of producing the antibiotic cephamycin C which method comprises cultivating a cephamycin C producing strain of *Streptomyces albogriseolus* in a culture medium containing assimilable sources of carbon and nitrogen under aerobic conditions until a substantial amount of said antibiotic is produced by said organism in the culture medium.

8. A method of producing the antibiotic toyocamycin which method comprises cultivating a toyocamycin producing strain of *Streptomyces albogriseolus* in a culture medium containing assimilable sources of carbon and nitrogen under aerobic conditions under a substantial amount of said antibiotic is produced by said organism in the culture medium.

3,914,159
REVERSING CLUTCH

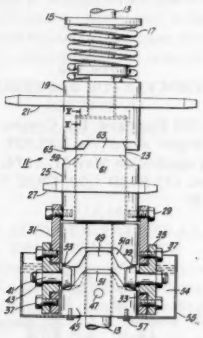
Ward F. Gidick, West Newton, Pa., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Sept. 4, 1973, Ser. No. 394,300

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C10B *21/10, 21/06*

U.S. Cl. 202—270 **10 Claims**



1. In a coke oven reversing mechanism including mechanical means operating both the fuel gas valves and the air and waste heat valves, a reversing clutch mechanism comprising:

a. a support shaft having fixed theron a cluch assembly with a cam profile on the surface therof;

b. a cam roller mounted to a sleeve surrounding said clutch assembly and engageable with said cam profile;

c. first sheave means secured to said first sleeve for turning said sleeve and urging said cam roller along the cam profile, said first sleeve moving axially of said shaft and engaging a second sheave engageable with said mechanical means; and

d. a second sleeve surrounding said shaft and supporting said second sheave.

6. In a coke oven reversing mechanism including mechanical means operating both the fuel gas valves and the air and waste heat valves, a reversing clutch mechanism comprising:

a. a support shaft having fixed theron a clutch assembly including peripheral surface groove having on one surface a cam profile;

b. a first slideable and rotatable sleeve surrounding said clutch assembly and carrying a cam roller that engages and coacts with said one surface;

c. means secured to said first sleeve for rotating said sleeve;

d. a second slideable and rotatable sleeve surrounding said shaft and spaced apart axially from said first sleeve;

e. rotatable means secured to said second sleeve;

f. resilient bias means urging said second sleeve toward said first sleeve; and

g. means that interconnects said first and second sleeves when said cam roller coacts with said cam profile and urges said first sleeve axially of said shaft, so constructed and arranged that, as said means for rotating said first sleeve turns, said rotatable means on said second sleeve rotates.

3,914,160
BATH FOR THE ELECTRODEPOSITION OF BRIGHT TIN-COBALT ALLOY

Shimetomo Fueki, Tokyo; Junichi Tada, Yokohama; Kenji Osawa, Hino; Naomi Sakai, and Kazuhiro Ogawa, both of Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 15, 1973, Ser. No. 360,542

Claims priority, application Japan, May 17, 1972, 47-48181; May 17, 1972, 47-48182; May 17, 1972, 47-48183; May 17, 1972, 47-48184

Int. Cl.² C25D *3/60*

U.S. Cl. 204—43 S **8 Claims**

1. A bright tin-cobalt alloy electroplating bath consisting essentially of an aqueous solution of:

a. a stannous salt present in an amount sufficient to provide from 2 to 70 grams of stannous metal per liter of said solution;

b. a cobalt salt present in an amount sufficient to provide from 1 to 40 grams of cobalt metal per liter of said solution, with the total amount of said stannous and cobalt metals being less than 75 grams per liter of said solution;

c. an alkali metal pyrophosphate present in an amount providing more than 2 mols thereof for each mol of said total amount of said stannous and cobalt metals; and

d. at least brightener additive selected from the group consisting of amino carboxylic acids with sulphur and which is present in said solution in an amount of from 0.01 to 5 grams per liter of said solution.

3,914,161
ELECTROPLATING SOLUTIONS FOR DEPOSITING SILVER ALLOYS AND A METHOD OF FORMING SILVER ALLOYS BY ELECTROPLATING

Kazuo Yonezawa; Kaname Nakao; Takashi Suzuki, and Satoshi Kaneda, all of Osaka, Japan, assignors to Matsushita Electric Industrial Company, Kadoma, Japan

Filed June 12, 1973, Ser. No. 369,196

Claims priority, application Japan, June 16, 1972, 47-60780; June 21, 1972, 47-62633; Sept. 16, 1972, 47-94826

Int. Cl.² C25D *3/58, 3/64*

U.S. Cl. 204—44 **13 Claims**

1. An aqueous electroplating bath for the deposition of an alloy of silver and copper, comprising 6 to 24 grams per liter of silver nitrate, 300 to 700 grams per liter of potassium iodide and 2 to 20 grams per liter of copper iodide, the pH value of the bath being not more than 3.0.

3. An aqueous electroplating bath for the deposition of an alloy of silver and indium, comprising 6 to 24 grams per liter of silver nitrate, 220 to 600 grams per liter of potassium iodide and 6 to 30 grams per liter of indium trichloride, the pH value of the bath being not more than 3.0.

5. An aqueous electroplating bath for the deposition of an alloy of silver and zinc, comprising 6 to 24 grams per liter of silver nitrate, 220 to 600 grams per liter of potassium iodide and 20 to 80 grams per liter of zinc iodide, the pH value of the bath being not more than 4.0.

7. An aqueous electroplating bath for the deposition of an alloy of silver, copper and indium, comprising about 8 grams per liter of silver nitrate, about 500 grams per liter of potassium iodide, about 14 grams per liter of copper iodide, about 8 grams per liter of indium trichloride and about 100 grams per liter of citric acid, the pH value of the bath being about 0.6.

8. An aqueous electroplating bath for the deposition of an alloy of silver, copper and zinc, comprising about 8 grams per liter of silver nitrate, about 500 grams per liter of potassium iodide, about 14 grams per liter of copper iodide, about 30 grams per liter of zinc iodide and about 100 grams per liter of citric acid, the pH value of the bath being about 0.6.

3,914,162

COMPOSITIONS AND PROCESS FOR THE ELECTRODEPOSITION OF METALS

Xavier Kowalski, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed June 25, 1973, Ser. No. 373,051. The portion of the term of this patent subsequent to Dec. 19, 1989 has been disclaimed.

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

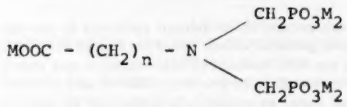
Int. Cl.[2] C25D *3/04, 3/12, 3/38, 3/56*

U.S. Cl. 204—46 G **10 Claims**

1. A process for the electrodeposition of divalent and polyvalent metal ions which comprises the steps of electrolyzing an aqueous solution comprising

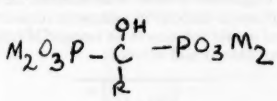
a. a divalent or polyvalent metal ion,

b. a carboxy amino phosphonic acid compound of the structure



and

c. a 1-hydroxy alkylidene-1,1-diphosphonic acid compound of the structure



wherein M is hydrogen, alkali metal, ammonium, alkyl ammonium, or amine, n is an integer of from 3 to about 11 and R is a C_{1-11} alkyl radical; the concentration of (a) in said aqueous solution being from about 1 percent to 5 percent; the molar ratio of (a):(b) being from about 1:1 to 1:5; and the molar ratio (a):(c) being from about 2:1 to 1:5; the pH of said aqueous solution being from about 6.0 to 10.0, and the temperature of said aqueous solution being from about 30° to 90°C.

3,914,163

RECOVERY OF METAL AND SULFATE VALUES FROM ELECTROCHEMICAL MINING ELECTROLYTES

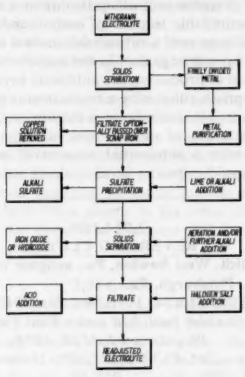
William F. Drinkard, Jr., Charlotte, and Henry S. Brown, Raleigh, both of N.C., assignors to Mineral Research & Development Corporation, Charlotte, N.C.

Filed May 17, 1974, Ser. No. 470,807

Int. Cl.[2] C25C *1/00, 1/12*

U.S. Cl. 204—105 R **10 Claims**

1. A method for recoving metal and sulfate values from electrolyte solutions withdrawn from the in situ electrolysis of sulfide ores wherein said solutions are acidic and contain copper, iron, sulfate and halogen ions comprising separating the solids from said withdrawn electrolyte, adding a calcium, barium or strontium alkaline earth metal oxide to said electrolyte to thereby form an insoluble precipitate with said sulfate ions, separating the precipitate from said electrolyte, precipitating iron from said electrolyte by pH increases and/or aeration, separating said iron precipitate and readjusting said electrolyte by the addition of a strong inorganic acid and a halogen to an acidic pH and a halogen ion concentration of at



least 1 molar returning the electrolyte to the cell and continuing the electrolysis.

3,914,164

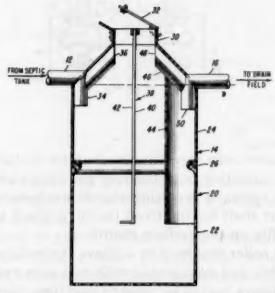
SYSTEM AND PROCESS FOR BACTERIAL REDUCTION OF WASTES

John W. Clark, 205 Hoagland, Las Cruces, N. Mex. 88001

Continuation-in-part of Ser. No. 282,929, Aug. 23, 1972, abandoned. This application May 31, 1974, Ser. No. 475,254

Int. Cl.[2] B03D *1/00;* **C02C** *5/12*

U.S. Cl. 204—149 **6 Claims**



1. The process of treating waste water effluent containing biological and decomposable organic matter comprising, in combination, the steps of:

a. introducing a waste water effluent into a tank from which it can flow;

b. electrolytically generating gas bubbles of a size ranging from 100 to 800 microns beneath the surface of the effluent in the lower reaches of the tank for reducing detrimental effects of flotation, preventing turbulent mixing caused by rapid vertical rise of bubbles; maximizing the utilization of oxygen for bacteria and other higher life forms and gently mixing the biological waste water;

c. forming a completely mixed environment containing sufficient dissolved oxygen for bacterial action while preventing the dispersion and breaking up of floc particles so that the floc is maintained within the range from 100 to 200 microns and contains bacterial and substrate

upon which protozoa and other higher life forms feed, flourish, and multiply; and

d. producing a runoff effluent from the tank which is low in BOD, settable solids and Fecal Coliforms.

3,914,165
RADIATION CURABLE NON-GELLED MICHAEL ADDITION REACTION PRODUCTS

Joseph E. Gaske, Mount Prospect, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Division of Ser. No. 290,068, Sept. 18, 1972, Pat. No. 3,844,916. This application Jan. 7, 1974, Ser. No. 431,441

Int. Cl.² C08F *2/50, 120/20;* **C08L** *63/02, 63/10*

U.S. Cl. 204—159.15 **9 Claims**

1. An ultraviolet radiation curable, non-gelled tertiary amine Michael addition reaction product of an aliphatic amine containing a single amino hydrogen atom selected from dibutyl amine and diethyl amine with a stoichiometric excess of a polyacrylate, said reaction product containing at least one unreacted acrylate group and at least one beta amino group providing resistance to oxygen inhibition of said ultraviolet radiation cure, said amine constituting at least 0.5% of the reaction product and the amino hydrogen atoms of said amine being substantially consumed in said reaction product.

3,914,166
BUTYRIC ACID DERIVATIVES AS NOVEL PHOTOSENSITIZERS

Hans Rudolph, Krefeld-Bockum; Hans-Georg Heine; Karl Fuhr, both of Krefeld, and Hermann Schnell, Krefeld-Uerdingen, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

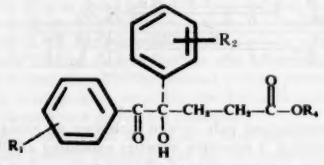
Division of Ser. No. 411,423, Oct. 31, 1973, abandoned, which is a division of Ser. No. 867,939, Oct. 20, 1969, Pat. No. 3,824,284. This application Nov. 29, 1974, Ser. No. 528,098

Claims priority, application Germany, Nov. 6, 1968, 1807301

Int. Cl.² C08F *8/00, 2/46;* **C08G** *18/00*

U.S. Cl. 204—159.15 **10 Claims**

1. In the process of preparing coatings and molded bodies by photopolymerizing a mixture of at least one ethylenically unsaturated polymerizable compound and a photosensitizer by irradiating said mixture with a radiation source, the improvement which comprises employing 0.1 to 5% by weight, based on said ethylenically unsaturated compound, of a photosensitizer of the formula



wherein R_1 and R_2 are identical or different and selected from the group consisting of hydrogen, alkyl having 1 to 4 carbon atoms, methoxy and halogen and R_4 is alkyl having 1 to 4 carbon atoms.

3,914,167
PROCESS FOR MAKING CIS-1,3-DICHLOROPROPENE

John B. Ivy; Gordon G. Willis, both of Lake Jackson, and David C. Kelsoe, Clute, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 26, 1974, Ser. No. 500,825

Int. Cl.² B01J *1/10;* **C07C** *21/04*

U.S. Cl. 204—163 R **6 Claims**

1. The process of making 1,3-dichloropropene consisting predominantly of the cis isomer from the still-bottoms from the production of allyl chloride by the chlorination of propylene, said process comprising

a. selectively halogenating the C_6 olefin components of the still-bottoms by reaction with elemental chlorine or bromine and

b. separating the cis-1,3-dichloropropene by distillation from the halogenated still-bottoms and concurrently or subsequently isomerizing the trans-1,3-dichloropropene in the halogenated still-bottoms to form essentially the equilibrium mixture of cis- and trans-1,3-dichloropropene and separating the cis isomer from the mixture and continuing such isomerization and separation until the desired conversion of trans- to cis-1,3-dichloropropene has been achieved.

3,914,168
ELECTROPHORESIS METHOD

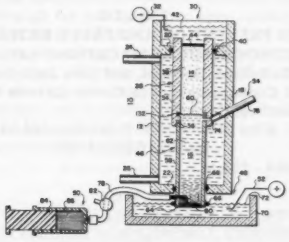
William B. Allington, Lincoln, Nebr., assignor to Instrumentation Specialties Company, Lincoln, Nebr.

Division of Ser. No. 344,144, March 23, 1973, Pat. No. 3,795,600, which is a continuation-in-part of Ser. No. 226,016, Feb. 14, 1972. This application Oct. 30, 1973, Ser. No. 411,145

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² B01K *5/00*

U.S. Cl. 204—180 G **21 Claims**



1. A method of preparing electrophoresis apparatus comprising the steps of:

inserting a structure that is sufficiently rigid to be at least self supporting into a tube in such a position as to divide the tube into two portions and to enable communication of the two portions with each other through the structure with the structure being substantially orthogonal to the internal walls of the tube at least at some portions of the structure;

closing the tube at a first location;

inserting a first medium which is mobile from an end of the tube until it fills the area between the first location and a second location a short distance on the opposite side of the structure from the first location;

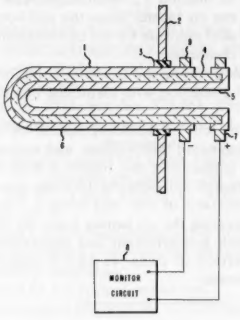
increasing the rigidity of the medium until it is sufficiently rigid to be supported by the structure, whereby said first medium serves as a first anticonvection medium; and

assembling said tube into an electrophoresis apparatus containing a second medium having better bulk flow characteristics than the first medium for series electrophoresis of a sample in the first and second medium.

3,914,169
OXYGEN DETECTOR HAVING A PLATINUM ELECTRODE ON A ZIRCONIA ELECTROLYTE

Samuel Jacob Horowitz, Snyder, N.Y., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Nov. 25, 1974, Ser. No. 527,153
Int. Cl.² G01N *27/30, 27/46*
U.S. Cl. 204—195 S **10 Claims**



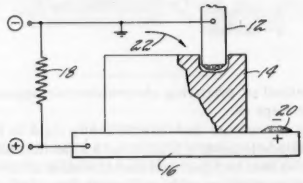
1. An oxygen detection device comprising a first electrode layer, an intermediate layer comprising zirconium oxide, and a second electrode layer comprising from 76 to 97.6 percent by weight platinum, and from 1.2 to 12 percent by weight of one or more oxides which are aluminum oxide or a lanthanide series rare earth element oxide.

2. The device of claim **1** wherein said first electrode comprises platinum and said second electrode layer contains from 1.2 to 12 percent by weight of a glass which is stable under reducing conditions.

3,914,170
EROSION PREVENTION AND FAULT DETECTION FOR ELECTROCHEMICAL MACHINING APPARATUS

Norman D. Ballard, Hartford, and John Zubeckis, Cromwell, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Mar. 19, 1973, Ser. No. 342,924
Int. Cl.² C25D *17/00*
U.S. Cl. 204—224 M **4 Claims**



1. In an electrochemical machining apparatus in which a cathode is spaced from a fixture-supported workpiece to provide a gap therebetween into which an electrolyte is disposed, said apparatus containing a first source of DC voltage which is connected intermittently to produce a DC potential difference between said workpiece and said cathode, a high DC current flowing from said workpiece to said cathode when said first DC source is connected and producing an electrochemical reaction at said workpiece, the improvement comprising

a second source of DC voltage, the magnitude of which is less than said first source, connected to generate a DC potential difference between said workpiece fixture and said cathode for producing a continuous DC current flow from said workpiece fixture to said cathode of a magnitude substantially less than the current flow produced by said first voltage source,

means for producing an operating signal indicative of the voltage drop produced by said second DC voltage source across said workpiece fixture and said cathode during periods when said first DC voltage source is disconnected,

means for producing a reference signal,

a comparator for comparing said operating signal with said reference signal and producing therefrom an output signal when said reference signal exceeds said operating signal,

and means responsive to said output signal for preventing connection of said first DC voltage source to produce a DC potential difference between said workpiece and said cathode.

Reforming

3,914,171
HYDROCARBON REFORMING PROCESS WITH HEATED AROMATIC RECYCLE

Hans-Juergen Schoennagel, Trenton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

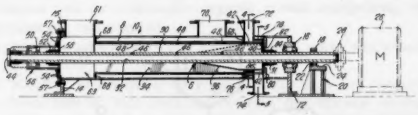
Filed Aug. 16, 1973, Ser. No. 389,070
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C10G *35/06*
U.S. Cl. 208—135 **8 Claims**

1. In the process of endothermically converting fresh feed comprising aliphatic hydrocarbons to a product consisting essentially of gas and a substantially aromatic liquid by contacting such with a ZSM-5 type of crystalline alumino silicate zeolite in the absence of added hydrogen at at a conversion temperature of 650° to 1500°F at an equivalent space velocity of up to about 15 WHSV; The improvement which comprises separating said gas and said aromatic liquid product; separating from said liquid product a substantially aromatic recycle stream; heating said separated recycle stream to a temperature which is insufficiently high to substantially degrade said aromatics but which is sufficiently high so that upon mixing said heated recycle stream with said fresh feed, the temperature of said admixture is a conversion temperature as aforesaid; mixing said heated portion and said fresh feed; and contacting said admixture with said zeolite.

3,914,172
PULP STOCK PRESSURE SCREEN

Stanley E. McGurk, Westmount, and Wavell Frederick Cowan, Montreal West, both of Canada, assignors to Highratio Screens Ltd., Montreal, Canada

Filed Aug. 23, 1973, Ser. No. 390,794
Claims priority, application United Kingdom, Aug. 31, 1972, 40338/72
Int. Cl.² B07B *1/04*
U.S. Cl. 209—273 **7 Claims**



1. A pressurized pulp screen including an elongated enclosed housing, a rotatable impeller extending axially within the housing, a screen plate of circular cross section mounted concentrically of the impeller, the screen plate and the housing being of such dimensions that there is a space between the screen plate and the wall of the housing, an inlet port provided in the area of one end of the housing for passing water and pulp stock within the screen plate, an accepted stock dis-

charge port communicating with the space between the housing and the screen plate for discharging accepted stock and at least one tailings discharge communicating at the discharge end of the housing with the inner space defined by the screen plate; the diameter of the cross section of the screen plate at the discharge end of the screen plate being such that the annular cross-sectional area of the space between the impeller and the inner surface of the screen plate is relatively small as compared to that adjacent said inlet port so as to reduce the flow of pulp stock through the discharge, and the length to diameter ratio of the screen plate is between 3:1 and 6:1 so that the area of the screen plate remains constant for predetermined screen requirements.

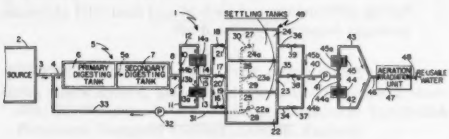
3,914,173
MINI SEWAGE TREATMENT SYSTEM

Donald H. Call, 39 Garth Road, West Roxbury, Mass. 02132; Elbridge L. Atwood, 3 Lantern Lane, Abington, Mass. 02351; Joseph A. Cary, 134 Auburn St., Brockton, Mass. 02402, and James D. Surette, 105 Prospect St., Braintree, Mass. 02184

Division of Ser. No. 284,726, Aug. 30, 1972, Pat. No. 3,825,494. This application Apr. 8, 1974, Ser. No. 459,070

Int. Cl.² C02C *1/08*; **C02B** *3/00*

U.S. Cl. 210—5 **1 Claim**



1. A method of treating raw human waste sewage to reduce it to a sterilized filtered odorless water product, comprising the steps of:

conducting said raw sewage to a primary digesting tank and digesting the sewage by bacterial action on the solids therein,

conducting the sewage from said primary digesting tank to a second stage digesting tank to obtain more complete bacterial action to further digest the sewage,

selectively passing the digested product from said second tank through one of two strainers of plastic screening material of approximately one fourth inch mesh in alternate sequence,

controlling said sequence in accordance with the fluid conducting condition of the strainers,

selectively passing the product from the strainers into a first one of three settling tanks for a predetermined period of time to permit any remaining sediment to settle to the bottom of the tank,

after the passage of said predetermined period of time, passing the product from the strainers into a second of the three settling tanks while allowing the first tank to lay dormant, passing the product from the strainers to the third of the three settling tanks after the product has passed into the second tank for said predetermined period of time and while the product is being passed into the third settling tank, emptying the first tank and allowing the second tank to remain dormant,

returning a portion of said product from said settling tanks to said primary digesting tank for recirculation at predetermined intervals,

passing said product from said settling tanks selectively to one of two filtering and odor neutralizing cells in alternate sequence,

controlling said sequence in accordance with the fluid conducting condition of the cells,

passing said product from said filtering and odor neutralizing cells to an aeration-radiation unit,

breaking said product up into minute particles in said aeration-radiation unit and flooding said particles with sterilizing ultra-violet rays, and removing the product therefrom as re-usable water.

3,914,174
LAYER MATERIAL FOR THE RAPID CHROMATOGRAPHIC IDENTIFICATION OF FLUID SUBSTANCES, METHOD FOR THE PREPARATION THEREOF, AND USE THEREOF

Helmut Fuchs, Raich-Ried, near Tegernau, Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed May 4, 1973, Ser. No. 357,440

Claims priority, application Switzerland, May 8, 1972, 6816/72

Int. Cl.² G01N *31/08*

U.S. Cl. 210—31 C **17 Claims**

1. Layer material for the rapid chromatographic identification of a liquid comprising:

A. a substrate-layer suitable for carrying out chromatographic tests, and

B. a combination of at least two elutable dyestuffs,

i. said dyestuff combination being in fine and even distribution on the surface or in the interior of said substrate layer,

ii. at least two dyestuffs of said combination having different solubilities in solvents of different polarities,

iii. at least one dyestuff of said combination being elutable through the substrate layer upon contact with the liquid to be identified, and

iv. at least two of said eluted dyestuffs having colours after elution, which are sufficiently different from one another to be distinguished by the eye;

the substrate layer and the dyestuffs being in such relationship to one another as to enable the formation of a ring chromatogram characteristic for said liquid.

3,914,175
APPARATUS FOR THE SEPARATION OF DIFFICULTY MISCIBLE OR NON-MISCIBLE LIQUIDS

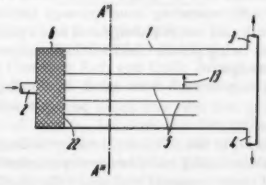
Otto Kunz; Rainer Hartmann, both of Frankfurt, and Johann Nicolay, Sinnersdorf, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft

Filed Dec. 21, 1972, Ser. No. 317,338

Claims priority, application Germany, Dec. 24, 1971, 2164477

Int. Cl.² B01D *37/00, 39/10, 17/04*

U.S. Cl. 210—73 **17 Claims**



1. Apparatus for the separation of liquid dispersions of two or more mutually insoluble or only partially soluble liquids

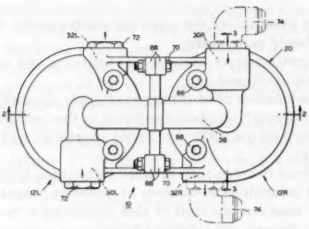
into the individual liquid phases comprising a separating tank having side walls and an inlet for the liquid mixture to be separated through a side wall, zig-zag shaped plate-like fittings arranged layer-wise one over the other in said tank, the peaks of which are located one over the other and whose valleys are located one over the other, said plate-like fittings extending across said tank from side wall to side wall thereof and horizontally in the direction of the liquid throughput, said plate-like fittings having outlets for the separated phases in said peaks and valleys opening up and down to the surrounding space of said tank, and, for the uniform distribution of the liquids to be separated, a diffusing device having liquid diffusing means in fiber and/or ribbon form adjacent the inlet to said tank and perforated plate means extending across a cross-sectional area of the tank following the diffusing means and immediately preceding the plate-like fittings.

3,914,176

DUAL FILTER ASSEMBLY

Donald E. Holmes, Clark Lake, Mich., assignor to Clark Equipment Company, Buchanan, Mich.

Filed May 6, 1974, Ser. No. 467,162
Int. Cl.² B01D *27/10*
U.S. Cl. 210—132 **8 Claims**



1. In combination, a dual filter assembly, including two single and independent filter assemblies joined in opposed back-to-back relation having individual filter heads for single filtering a volume of fluid in excess of the capacity of one of said single filter assemblies, each filter having sealingly secured thereto a cylindrical filter bowl open at one end, as well as an annular filter element operatively mounted in the bowl, said dual filter assembly including:

a. a fluid inlet passage in each filter head, said inlet passage merging near its outer end into a generally annular passage that is concentric with and opens into the filter bowl interior, said inlet passage also merging at its relatively inner end into an outwardly extending upper passage substantially normal to said inlet passage;

b. a fluid outlet passage in each filter head, said outlet passage merging near its inner end into a generally cylindrical cavity, bounded by a head wall portion, that opens into the filter bowl interior and is in sealing relationship relative to annular end surface of said filter element, said outlet passage also merging at its relatively inner end with an outwardly extending lower passage substantially normal to both said outlet passage and said cylindrical cavity as well as being parallel and vertically aligned with said upper passage;

c. a passageway in each filter head, said passageway interconnecting said inlet and upper passages with said cylindrical cavity; and

d. valve means in the cylindrical cavity of each filter head for normally closing said passageway interconnecting said inlet and upper passages with said cylindrical cavity, said valve means permitting direct communication of said fluid inlet and upper passages with said outlet passage when the differential pressure across the filter element exceeds a predetermined limit;

said dual filter assembly having said two filter heads joined in an opposed back-to-back relation so as to permit sealed communication therebetween via abutting outer ends of said opposed upper and lower passages respectively, said filter element of each of said filter assemblies, being mounted in the normal path of fluid flow between said inlet and outlet passage, said joined filter heads having one each of its dual inlet and outlet passages closed off, with said fluid to be filtered, upon entering said other fluid inlet passage being divided into two portions with one portion of said fluid flowing from said open inlet passage through said associated generally annular passage into said filter bowl interior, with said other portion of said fluid flowing from said inlet passage via said associated upper passage and continuing through the adjoining upper passage of the adjoining filter assembly into its inlet passage and via said annular passage into the filter bowl interior, each fluid portion being cleaned by flowing through its respective filter element and continuing on into its respective filter head cylindrical cavity, with the cleaned fluid portion of the one of said filter assemblies which has its outlet passage closed off, flowing via said adjoining lower passages to the other of said filter assemblies wherein the cleaned fluid portions of both of said assemblies recombine in the outlet passage of the filter assembly having an open outlet passage and exit therefrom whereby several alternate single fluid inlet and outlet connection hookup modes are made possibly by having differing ones of each of said dual inlet and outlet passages respectively, closed off.

3,914,177

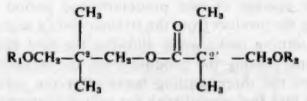
HYDROXY PIVALYL HYDROXY PIVALATE ESTERS AND METHOD OF TREATING TEXTILE FILAMENTS THEREWITH

Roop Nahta, Nutley; William F. Bernholz, Wayne; John Percy Redston, Montclair, and Murray Warman, East Brunswick, all of N.J., assignors to PVO International Inc., San Francisco, Calif.

Continuation-in-part of Ser. No. 236,963, March 22, 1972, abandoned. This application Apr. 22, 1974, Ser. No. 462,744
Int. Cl.² D06M *13/16*
U.S. Cl. 252—8.8 **21 Claims**

1. An aqueous emulsion for application to synthetic linear organic polymer filaments in a continuous operation which consists essentially of:

a. a hydroxy pivalyl hydroxy pivalate diester represented by the formula:



wherein R_1 and R_2 are taken from the class consisting of radicals of alkanoic and alkenoic monocarboxylic acids having from 2 to 24 carbon atoms,

b. A surface active emulsifier compatible with said diester, and

c. water,

said emulsion containing from about 1 to about 25 percent nonaqueous solids, said nonaqueous solids containing from about 50 to about 80 percent of said diester and from about 50 to about 20 percent of said surface active emulsifier, all of the above by weight.

3,914,178

WEAR REDUCING COATING

Charles A. Fineran, East Orange, and Steven S. Silwones, New Providence, both of N.J., assignors to Amerace Corporation, New York, N.Y.

Filed Jan. 23, 1974, Ser. No. 435,889

Int. Cl.² C10M *5/00, 7/00*

U.S. Cl. 252—12 **23 Claims**

1. A coating for reducing the wear of two opposed stainless steel metallic surfaces disposed in sliding relationship with one another comprising:

a first layer having an elastic modulus inclusive of and greater than about 20,000,000 p.s.i. and comprised of a metal selected from a member of the group consisting of platinum, manganese, cobalt, nickel, chrominum, beryllium, rhodium, molybdenum, tungsten, ruthenium, iridium, and alloys thereof;

a second layer having an elastic modulus inclusive of and lower than about 17,000,000 p.s.i. and comprised of a metal selected from a member of the group consisting of palladium, copper, gold, zirconium, silver, cadmium, tin, lead and alloys thereof;

and a layer comprised of an inorganic lubricant, wherein said first layer is applied to one of said metallic surfaces and said second layer is applied to the other metallic surface, and

said second layer is a substrate for said inorganic lubricant layer.

3,914,179

SYNTHETIC LUBRICANTS FOR AERO GAS TURBINES

Derek Clark Byford, Stains, and Anthony Arnold John Mundye, Old Windsor, both of England, assignors to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 171,312, Aug. 12, 1971, abandoned, which is a continuation-in-part of Ser. No. 711,877, March 11, 1968, abandoned. This application Apr. 10, 1974, Ser. No. 459,765

Claims priority, application United Kingdom, Mar. 20, 1967, 12842/67

Int. Cl.² C10M *1/44, 3/38, 5/24, 7/24*

U.S. Cl. 252—32.5 **19 Claims**

1. A lubricating composition comprising an ester basestock consisting of a liquid neutral polyester that has been prepared by reacting together under esterification conditions and in at least one stage

i. an aliphatic alcohol selected from the group consisting of monohydric alcohols, polyhydric alcohols, and mixtures thereof, said alcohol having 5 to 10 carbon atoms per molecule and having no hydrogen atoms attached to any carbon atom in a 2 position with respect to any —OH group and

ii. an aliphatic acid selected from the group consisting of monocarboxylic acid, polycarboxylic acid, and mixtures thereof, said acid having 3–12 carbon atoms per molecule,

the basestock having dissolved therein:

a. 1.0 to 8.0% wt of an alkylated aromatic amine antioxidant, said antioxidant selected from the group consisting of mono-C_1 to C_{14} alkyl phenyl naphthylamines di-C_1 to C_{14} alkyl phenyl naphthylamines, phenothiazines, iminodibenzyls and diphenyl phenylenediamines, and mixtures of the foregoing,

b. 0.005 to 1.5% wt of a copper passivator, said passivator selected from the group consisting of azole, derivatives thereof, salicylaldehyde semicarbazone, C_1 to C_{20} alkyl derivatives thereof, condensation products of salicylaldehyde and hydrazine derivatives, and fatty acid salts of such condensation products,

c. 0.5 to 5.0% wt of a neutral organic phosphate of the formula $(RO)_3PO$ where the groups R are tolyl, phenyl or xylyl groups or alkyl groups having up to 10 carbon atoms or cycloalkyl groups having up to 10 carbon atoms, and

d. 0.005 to 0.5% wt of a neutral salt of a dialkyl hydrogen phosphate of the formula $(R^1O)_2P(O)OH$, where R^1 is an alkyl group having up to 10 carbon atoms or a cycloalkyl group having up to 10 carbon atoms, and an amine having not more than 30 carbon atoms.

3,914,180

GLASS CUTTING FLUID

Thomas E. Boller, Southfield, and Salvatore Guerra, Melvindale, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed May 4, 1973, Ser. No. 357,402

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C10M *1/30*

U.S. Cl. 252—58 **2 Claims**

1. A fluid for use in a glass cutting operation wherein the fluid acts to lubricate the glass cutting tool and to reduce spalling of the glass at the score therealong, which fluid comprises: 70 to 97 percent by volume of methyl chloroform which acts as a cutting tool lubricant, and 30 to 3 percent by volume of a hydrocarbon oil of lubricating viscosity in said methyl chloroform.

3,914,181

ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS

Allen Clark Berg, Rochester; Rudolph Fargensi, and Anthony Frank Lipani, both of Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 160,893, July 8, 1971. This application Mar. 8, 1974, Ser. No. 449,300

Int. Cl.² G03G *9/02, 13/08*

U.S. Cl. 252—62.1 **13 Claims**

1. An electrostatographic developer mixture comprising finely-divided toner particles electrostatically clinging to the surfaces of carrier beads having a particle size from about 30 to about 1,000 microns, each of said carrier beads comprising nickel-zinc ferrite beads comprising about 0.1 to about 0.9 moles of nickel, about 0.1 to about 0.9 moles of zinc, and about 1.4 to about 4.0 moles of iron, said carrier beads being further characterized as being substantially dense and uniform in size and shape with maximum roundness and sphericity and having substantially uniform electrostatographic properties such as triboelectricity, magnetic permeability, and electrical conductivity.

5. An electrostatographic developer mixture comprising finely-divided toner particles electrostatically clinging to the surfaces of carrier beads having a particle size from about 30 to about 1,000 microns, each of said carrier beads comprising manganese-zinc ferrite beads comprising about 0.1 to about 0.9 moles of manganese, about 0.1 to about 0.9 moles of zinc, and about 1.4 to about 4.0 moles of iron, said carrier beads being further characterized as being substantially dense and uniform in size and shape with maximum roundness and sphericity and having substantially uniform electrostatographic properties such as triboelectricity, magnetic permeability, and electrical conductivity.

3,914,182

HYDRAULIC FLUIDS

Robert Alan Cameron Ker, and Colin John Harrington, both of London, England, assignors to Burmah Oil Trading Limited, London, England

Continuation of Ser. No. 219,504, Jan. 20, 1970, abandoned. This application Dec. 14, 1973, Ser. No. 424,712

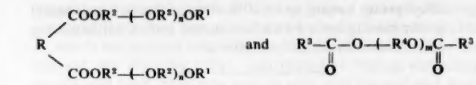
Claims priority, application United Kingdom, Jan. 21, 1971, 2873/71; July 21, 1971, 34240/71

Int. Cl.² C09K *50/00*

U.S. Cl. 252—78 **6 Claims**

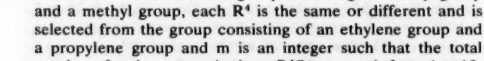
1. A hydraulic fluid consisting essentially of from 10 to 90% by weight of at least one ester having a general formula se-

lected from the group consisting of:



I II

wherein R is selected from the group consisting of straight chain alkylene groups containing 2 to 8 carbon atoms and branched chain alkylene groups containing 2 to 8 carbon atoms, each R^1 is the same or different and is selected from the group consisting of alkyl radicals containing from 1 to 4 carbon atoms and a phenyl radical, each R^2 is the same or different and is selected from the group consisting of an ethylene group, a propylene group and a butylene group, each *n* is the same or different and is selected from the group consisting of O and an integer of from 1 to 3, each R^3 is the same or different and is selected from the group consisting of an ethyl group and a methyl group, each R^4 is the same or different and is selected from the group consisting of an ethylene group and a propylene group and m is an integer such that the total number of carbon atoms in the $+R^4O)_m$ group is from 4 to 12, and from 10 to 90% by weight of at least one borate ester having the general formula



III

wherein each R^5 is the same or different and is selected from the group consisting of straight chain alkyl groups containing from 1 to 4 carbon atoms and branched chain alkyl groups containing from 1 to 4 carbon atoms, each R^6 is the same or different and is an alkyl group containing from 1 to 8 carbon atoms and each *p* is the same or different and is an integer of from 1 to 8.

3,914,183

COMPOSITION IN BEAD FORM CONTAINING A WATER-INSOLUBLE POLYSACCHARIDE ACTIVATED BY CYANOGEN HALIDE, AND A PROCESS FOR THE PREPARATION OF SAME

Haldor Ingemar Johansson; Helga Katarina Lundgren, and Marius Klaus Joustra, all of Uppsala, Sweden, assignors to Pharmacia Fine Chemicals AB, Uppsala, Sweden

Filed Apr. 3, 1973, Ser. No. 347,503
Claims priority, application Sweden, Apr. 7, 1972, 4508/72
Int. Cl.² C07G 7/02
U.S. Cl. 252—184 **11 Claims**

1. A composition in bead form containing

a. 5 – 80% of a water-insoluble cyanogen halide activated polysaccharide or a water-insoluble cyanogen halide activated derivative of polysaccharide, said polysaccharide or derivative of polysaccharide being intended to serve as a matrix for coupling amino group-containing substances and said cyanogen halide being a halide other than a fluoride,

b. a water-soluble acid in a quantity sufficient to lower the pH of an aqueous solution thereof to a value in the range of from 5 to approximately 2,

c. 25 – 95% of at least one water-soluble polysaccharide, and

d. 0 – 4% of water

said cyanogen halide activated polysaccharide or derivative thereof being stabilized against decrease in its reactivity and loss of its swellability when stored.

10. A process for the preparation of a composition in bead form containing 5 – 80% of a water-insoluble cyanogen halide activated polysaccharide or a water-insoluble cyanogen halide activated derivative of a polysaccharide, said polysaccharide or derivative of polysaccharide being intended to serve as a matrix for coupling amino group-containing substances, said cyanogen halide being a halide other than a flouride, a water-soluble acid in a quantity sufficient to lower the pH of an aqueous solution thereof to a value in the range of from 5 to approximately 2, 25 – 95% of at least one water-soluble polysaccharide and 0 – 4% of water, said percentages being calculated on the total weight of the composition, said cyanogen halide activated polysaccharide or cyanogen halide activated derivative of polysaccharide being stabilized against decrease in reactivity and loss of its swellability when stored, characterized in that swollen beads of the water-insoluble cyanogen halide activated polysaccharide or the water-insoluble cyanogen halide activated derivative of polysaccharide is added with the water-soluble polysaccharide or water-soluble derivative of polysaccharide and the acid to form a mixture and in that the mixture is lyophilized to a water content in the range of from 0 – 4% by weight.

3,914,184

METHOD FOR CONVERTING CRYSOTILE ASBESTOS

Yoshiro Harada, Skokie, and William B. Crandall, Wheaton, both of Ill., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 17, 1973, Ser. No. 407,378
Int. Cl.² B01J 29/00
U.S. Cl. 252—457 **2 Claims**

1. A method for effecting the conversion of chrysotile asbestos to a material having a desired compositional content of from about 80 to 90 weight percent of magnesium hydroxide with the balance substantially all asbestos which comprises subjecting said asbestos to a cyclic procedure in which each individual cycle consists essentially of the steps of:

A. forming a mixture of reactants consisting essentially of asbestos and a 20 to 60 percent aqueous solution of potassium hydroxide;

B. heating said mixture to a temperature of from about 150°C to 200°C;

C. maintaining said mixture at said temperature for a period of from about 2 to 100 hours to effect a partial conversion of said asbestos to a magnesium hydroxide containing material and the concurrent production of reaction by-products;

D. removing said potassium hydroxide solution from said mixture;

E. washing the resultant mixture with hot water for a period of time sufficient to wash away said reaction by-products; and

F. repeating said individual cyclic procedure for a number of times sufficient to effect the conversion of said asbestos to said desired compositional content.

3,914,185

METHOD OF PREPARING LIQUID DETERGENT COMPOSITIONS

Jack Thomas Inamorato, Westfield, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 15, 1973, Ser. No. 341,489
Int. Cl.² C11D 1/29, 1/72, 1/75, 3/33
U.S. Cl. 252—546 **9 Claims**

1. A method of preparing a clear, heavy-duty liquid detergent composition free of phosphates in the absence of heat and without gel formation which comprises the steps of (a) mixing a synthetic organic detergent selected from the group consisting of ethylene oxide condensate nonionic detergents, C_{10}–C_{20} alkyl polyethoxy sulfates of the formula $RO(C_2H_4O)_n$-SO_3M wherein n is 2 to 6 and M is sodium, potassium, ammonium, lower alkylamino or lower alkanolamino, mixtures thereof; and mixtures of said nonionic detergents or said alkyl polyethoxy sulfates with water-soluble C_{10}–C_{16} alkyl benzene sulfonates or amine oxides having the formula $R_1R_2R_3N \rightarrow O$ wherein R_1 is an alkyl of 10 to 16 carbon atoms and R_2 and R_3 are each methyl or ethyl, with an organic solvent selected from the group consisting of C_2–C_3 alkanols and ethylene glycol monoethyl ether to form a first solution; (b) forming a

solution of sodium or potassium nitrilotriacetate in water; and (c) admixing the first solution with said nitrilotriacetate solution to form a clear liquid detergent consisting essentially of 5% to 30% by weight of said detergent, 2% to 15% by weight of said solvent, 5% to 25% by weight of said nitrilotriacetate and the balance water.

3,914,186

SPONGE RUBBER RUG UNDERLAY HAVING IMPROVED HEAT AGE RESISTANCE

Richard E. Benton, Alliance, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Filed Apr. 16, 1973, Ser. No. 351,218

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C08J 9/00

U.S. Cl. 260—2.5 HB **3 Claims**

1. A cured flexible sponge rubber rug underlay composition, which is capable of withstanding a temperature of about 275°F. for at least about 24 hours without appreciable degradation or loss of resiliency, comprising:

a. about 100 parts by weight of a rubber which may be subject to oxidative degradation and which is selected from the group consisting of natural rubber and a rubbery copolymer consisting of butadiene and styrene;

b. from about 150 and to 300 parts by weight of calcium carbonate;

c. from about 0.5 to 3.0 parts by weight of an antioxidant comprising a low temperature reaction product of diphenyl amine and acetone; and

d. from about 1.0 to 3.0 parts by weight of trisodium phosphate.

3,914,187

INSOLUBLE, POROUS COMPLEXES MADE FROM A CROSSLINKED, NITROGEN CONTAINING POLYMER AND A PHENOL

Marvin M. Fein, Westfield, N.J.; Nathan D. Field, Allentown, and Earl P. Williams, Pen Argyl, both of Pa., assignors to GAF Corporation, New York, N.Y.

Division of Ser. No. 25,249, April 2, 1970, abandoned. This application Jan. 25, 1974, Ser. No. 436,609

Int. Cl.² C08J 9/00

U.S. Cl. 260—2.5 B **9 Claims**

1. A process which comprises subjecting porous granules or bead comprising a complex compound of a phenolic material with a water insoluble but water swellable crosslinked polymer of an N-vinyl lactam or an N-alkyl-N-vinyl amide, produced by polymerizing a monomeric mixture of said N-vinyl lactam or said N-alkyl-N-vinyl amide and a polyfunctional unsaturated crosslinking agent, to continuous contact with a liquid environment in which said phenolic material is soluble or readily dispersible by passing said liquid over said porous granules or beads at a flow rate sufficient to continuously and gradually release a portion of said phenolic material from said complex compound into said liquid environment and continuously withdrawing the resulting phenolic-containing liquid environment from said porous granules or beads.

3,914,188

METHOD OF PREPARING CELLULAR FOAMS USING POLYMERIC STABILIZER OF CYCLIC NITROGENOUS MONOMERS

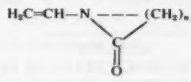
Felix P. Carroll, Chester, Pa.; John R. Panchak, Wilmington, Del., and Nelson N. Schwartz, Broomall, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 31, 1974, Ser. No. 438,241

Int. Cl.² C08G 18/14, 73/06; C08L 75/04, 79/04

U.S. Cl. 260—2.5 AG **10 Claims**

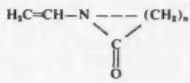
1. In the method of preparing a cellular foam from a precursor formulation comprising an isocyanate having at least two isocyanato groups per molecule, a catalyst, and a blowing agent, the improvement which comprises adding from 0.2 to 5.0 parts by weight per 100 parts by weight of said precursor formulation of the product of a free radical-initiated polymerization of a cyclic nitrogenous monomer as the sole monomer in said polymerization being carried out substantially to completion in the presence of a polyfunctional polyether polyol which has been treated with a capping agent to convert substantially all of the hydroxyl groups of said polyether polyol to groups substantially inert to isocyanates, said cyclic nitrogenous monomers having the structural formula:



wherein

n=3, 4, or 5.

3. In the method of preparing a cellular foam from a precursor formulation comprising an isocyanate having at least two isocyanato groups per molecule, a catalyst, and a blowing agent, the improvement which comprises adding from 0.2 to 5.0 parts by weight per 100 parts by weight of said precursor formulation of the product of a free radical-initiated copolymerization of a cyclic nitrogenous monomer having the structural formula:



wherein

n = 3, 4, or 5 and an esterified unsaturated dibasic acid having the structural formula:

$$C_uH_{2u-2}(CO_2C_vH_{2v+1})_2$$

wherein

u is 2 or 3, and

v is an integer from 3 to 6,

said free radical-initiated copolymerization being carried out substantially to completion in the presence of a polyfunctional polyether polyol and the resulting material is treated with a capping agent to convert substantially all of the hydroxy groups of said polyether polyol to groups substantially inert to isocyanates.

3,914,189

METHOD FOR PRODUCTION OF POLYURETHANE FOAM USING OXAZOLINES AS CATALYSTS

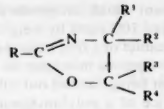
Bernard Rudner, Ridgewood, N.J., and Peter Daniel Pauly, Mountaintop, Pa., assignors to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Mar. 15, 1974, Ser. No. 451,659

Int. Cl.² C08G 18/14, 18/20

U.S. Cl. 260—2.5 AC **14 Claims**

1. In a method for the production of polyurethane foam from a reaction mixture comprising at least one organic isocyanate having at least two isocyanate groups per molecule and at least one polyol in the presence of a blowing agent, the improvement which comprises effecting the reaction in the presence of a catalytic amount of a catalyst comprising a compound of the formula



where R represents hydrogen or a hydrocarbyl group containing from 1 to 23 carbon atoms, R^1, R^2, R^3 and R^4 represent hydrogen, hydrocarbyl groups having from 1 to 7 carbon atoms or hydroxy-substituted hydrocarbyl groups having from 1 to 7 carbon atoms, and where R^1, R^2, R^3, and R^4 may be the same or different.

3,914,190

METHOD OF PREPARING CELLULAR FOAMS USING COPOLYMERIC STABILIZERS OF SELECTED NITROGENOUS MONOMERS AND ESTERS OF UNSATURATED DIBASIC ACIDS

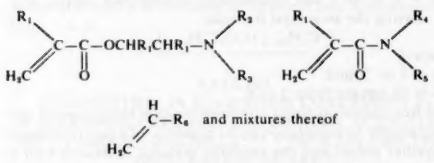
Felix P. Carroll, Chester, Pa.; John R. Panchak, Wilmington, Del., and Nelson N. Schwartz, Broomall, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Apr. 10, 1974, Ser. No. 459,627

Int. Cl.² C08G *18/14, 18/48, 18/62, 18/58*

U.S. Cl. 260—2.5 AG **10 Claims**

1. In a method of preparing a cellular foam from a precursor formulation comprising an isocyanate having at least two isocyanato groups per molecule, a catalyst, and a blowing agent, the improvement which comprises adding from about 0.2 to about 5.0 parts by weight per 100 parts by weight of the precursor formulation of the product of a free radical-initiated polymerization of a polymerizable monomeric system of a nitrogenous monomer selected from the group consisting of monomers having the following structural formulas:



and mixtures thereof

wherein:

R_1 is hydrogen or methyl,

R_2 is hydrogen and R_3 is a tertiary alkyl group having 4 – 5 carbon atoms, or

R_2 and R_3 are alkyl groups having 1 – 5 carbon atoms and are either taken separately or are combined to form a divalent organic group such that the nitrogen atom of said structural formula is the only heteroatom and is included in a 5, 6 or 7 membered ring, said divalent organic group having no reactive pendant substituents.

R_4 is H or an alkyl group having 1 – 5 carbon atoms, and

R_5 is an alkyl or a carbonyl substituted alkyl group having 1 – 6 carbon atoms,

R_4 and R_5 are either taken separately or are combined to form a divalent organic group such that the nitrogen atom of said structural formula is the only heteroatom and is included in a 5, 6 or 7 membered ring, said divalent organic group having no reactive pendant substituents, and

R_6 is a pyridine, imidazole or benzimidazole group, and

an ester of an unsaturated dibasic acid having the formula

$$C_uH_{2u-2}(CO_2C_vH_{2v+1})_2$$

wherein:

u is 2 or 3, and

v is an integer from 3 to 6,

said free radical-initiated polymerization being carried out substantially to completion in the presence of a polyfunctional polyether polyol, said polyol is treated either before or after said free radical-initiated polymerization with a capping agent to convert substantially all of the hydroxyl groups of said polyol to groups substantially inert to isocyanate.

3,914,191

METHYL FORMAT E-TRICHLOROMONOFLUOROMETHANE BLOWING AGENT FOR POLYSTYRENE

Robert J. Scott, New City, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed July 31, 1974, Ser. No. 493,420

Int. Cl.² C08J *9/14*

U.S. Cl. 260—2.5 E **2 Claims**

1. A process for producing polystyrene foam which comprises (1) forming a mixture of (a) a major amount of polystyrene and (b) minor amount of a liquid azeotrope consisting of 18 parts by weight of methyl formate and 82 parts by weight of trichloromonofluoromethane per 100 parts by weight of the azeotrope and (2) maintaining the mixture at a temperature at which the azeotrope volatilizes to produce a polystyrene foam.

3,914,192

GLOSS FIBERS COATED WITH A SIZE COMPRISING A FILM-FARMING BINDER AND AN AMINO ACID

Martin C. Flautt, Granville; Kevin M. Foley, Hebron, and Richard M. Haines, Warsaw, all of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed Aug. 6, 1973, Ser. No. 386,143

Int. Cl. B32b *17/04, 17/10*

U.S. Cl. 260—4 R **11 Claims**

1. Glass fibers having a thin coating thereon, said coating being formed from a film-forming binder selected from the group consisting of polyolefins; polymers of butadiene; copolymers of maleic anhydride and an unsaturated monomer selected from the group consisting of a conjugated diene, an alkyl acrylate, an alkyl methacrylate and a vinyl aromatic monomer; polyvinyl alcohol; polyvinyl acetate; polyvinyl chloride; polyepoxides and polyesters and an amino acid containing 2 to 12 carbon atoms, with the coating containing 0.5 to 5 parts by weight of the amino acid for each 2 to 25 parts by weight of the binder.

3,914,193

INTUMESCENT COATING COMPOSITIONS CONTAINING CRYSTALLINE MELAMINE PYROPHOSPHATE

Robert Glenn Fessler, Martinsville, and Bruce Charles Tredinnick, Flemington, both of N.J., assignors to American Cyanamid Company, Stanford, Conn.

Continuation-in-part of Ser. No. 817,168, April 17, 1969, Pat. No. 3,635,970. This application Nov. 18, 1971, Ser. No. 200,171

Int. Cl.² C08L *23/02;* **C09D** *5/18*

U.S. Cl. 260—17 R **4 Claims**

1. An intumescent fire retardant latex coating composition consisting of an aqueous latex coating vehicle containing from about 16 to about 65 percent by weight of a readily water dispersible melamine pyrophosphate in a low viscosity crystalline form which is dispersible in aqueous latex paint systems to form a fire retardant coating,

which crystalline form is characterized by having the maximum intensity peak in its X-ray diffraction pattern at about 3.25 A, and other peaks at about 4.71, 4.94, 5.33, 10.64 and 10.77;

on heating loses weight substantially continuously with increasing temperature between 300° and 350°C.;

and which when pasted with water is stirrable and flowable in the proportions of between about 100 grams melamine pyrophosphate per 100 grams of water and about 180 grams of melamine pyrophosphate per 100 grams of water.

3. The intumescence latex coating of claim 2 in which the composition is:

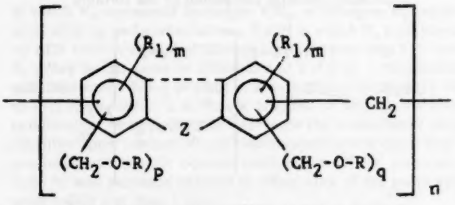
Water	54.1	to	33.0	parts
Potassium tripolyphosphate	0.2		0.6	
Ethoxylated castor oil	0.2		0.4	
Phenyl mercuric acetate (30%)	0.03		0.06	
Waxy-fatty ester defoamer (12½% solids)	0.2		0.5	
Dipentaerythritol	4.0		7.0	
Chlorinated paraffin	0.0		3.6	
TiO_2	4.0		5.0	
Melamine pyrophosphate	16.5		28.0	
Vinyl Acetate Resin (55% solids)	11		20	
Hydroxy ethyl cellulose (1¾%)	10		5.	

3,914,194
UNSATURATED FORMALDEHYDE COPOLYMER RESINS DERIVED FROM DIARYL OXIDES, SULFIDES, DIBENZOFURAN OR DIBENZOTHIOPHENE

Harry A. Smith, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Apr. 2, 1973, Ser. No. 347,173
Int. Cl.² C08L *91/00*; **C08G** *8/08, 16/02, 16/04*
U.S. Cl. 260—18 R **8 Claims**

1. A formaldehyde copolymer resin having dependent unsaturated groups with the repeating unit:



wherein R is an aliphatic acyl group derived from saturated acids having 2–6 carbons, olefinically unsaturated acids having 3–20 carbons, or an omega-carboxy-aliphatic acyl group derived from olefinically unsaturated dicarboxylic acids having 4–12 carbons or mixtures thereof, R_1 is independehtly hydrogen, an alkyl group of 1–10 carbon atoms, or halogen, Z is selected from oxygen, sulfur, the group represented by Z taken with the dotted line represents dibenzofuran and dibenzothiophene moieties, or mixtures thereof, *n* is a whole number sufficient to give a weight average molecular weight greater than about 500, *m* is 0–2, *p* and *q* have an average value of 0 to 1 with the proviso that the total number of *p* and *q* groups are sufficient to give greater than one unsaturated group per resin molecule.

3,914,195
PREPARATION OF SOLID POLYAMIDES USEFUL AS INK BINDERS

Schumkichiro Asai; Yasuyuki Kawakatsu; Wataru Yano; Hisao Kayamoto; Makoto Tashima, and Itsuo Minakata, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1973, Ser. No. 425,626
Claims priority, application Japan, Dec. 19, 1972, 47-127472
Int. Cl.² C08G *69/02*
U.S. Cl. 260—18 N **7 Claims**

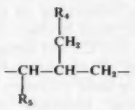
1. A solid polyamide resin useful as a binder resin for printing ink, comprising the reaction product of a dibasic acid or ester reactant, a monobasic acid reactant and a diamine reactant, which are reacted at a molar ratio of from 0.15 to 0.24 mole of dibasic acid or ester reactant and 0.2 to 0.02 mole of monobasic acid reactant per 0.25 mole of diamine reactant so that the ratio of carboxyl equivalent to amine equivalent is substantially 1:1, at 130° to 270°C, for from 1 to 20 hours, said polyamide having from 3 to 50 recurring amide structural units,

A. said dibasic acid or ester reactant consisting essentially of

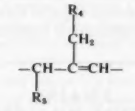
1. up to 50 mole percent of dimer acid having 32 to 44 carbon atoms or dibasic acid of the formula $HOOC(CH_2)_pCOOH$ wherein *p* is an integer of from 4 to 8,
2. the balance is a compound or mixture of compounds having the formula

$$R_2OOC-CH_2-CH_2-R_1-CH_2-CH_2-COOR_2$$

wherein R_1 has the formula



or



wherein one of R_4 and R_5 is hydrogen and the other thereof is $-C(CH_3)_3$, and R_2 is hydrogen or a radical which forms an ester with acrylic acid, and

B. said monobasic acid reactant is a monobasic acid or mixture of monobasic acids capable for controlling the molecular weight of the polyamide product, and

C. said diamine reactant has the formula

$$H_2N-R_3-NH_2$$

wherein R_3 is a divalent aliphatic, aromatic or alicyclic hydrocarbon radical having up to 10 carbon atoms.

3,914,196
POLYMERIC PIGMENTS AND METHOD FOR PREPARATION THEREOF

Norman Raymond Loeffler, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 10, 1973, Ser. No. 423,040
Int. Cl.² C08F *19/18*
U.S. Cl. 260—29.7 H **15 Claims**

1. A method for preparing an aqueous dispersion of polymeric particles which are non-film forming at ambient temperature and are useful as pigment in paper coatings, said particles having rough surfaces and an average particle diameter in the range from about 0.3 to about 1.0 micrometer with no more than about 5 weight percent of said particles based on total weight of particles having diameters outside said range, which method comprises the steps of (1) subjecting to emulsion polymerization a polymerization reaction mixture comprising an aqueous medium, a catalyst and an incrementally-added initial portion of emulsion polymerizable monomer, essentially in the absence of external emulsifiers which are conventionally employed in emulsion polymerization wherein the term external emulsifiers excludes polymerization catalysts and monomeric materials, said initial portion constituting at least about 35 weight percent up to and including 99.9 weight percent of total monomer, (2) subsequently adding from about 0.05 to about 10 weight percent based on total monomer of a fluid base to the recipe; and (3) continuing addition and emulsion polymerization of the remaining portion of the total monomer, said total monomer being capable of polymerizing to form a non-film forming polymer.

3,914,197

PROTECTIVE COATING COMPOSITION

Daniel Schoenholz, Basking Ridge; Arthur W. Petersen, Florham Park, and Leonard Hirschberger, Marlboro, all of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 8, 1974, Ser. No. 459,150
Int. Cl.² C08L *91/06*
U.S. Cl. 260—28.5 A **9 Claims**

1. A protective coating composition consisting essentially of, by weight, from about 7 to 17 percent of a condensed hydrocarbon resin, from about 1 to 5 percent of an organic solvent soluble wax having a melting point in the range of about 45° to 50°C., from about 2 to 5 percent of polydimethyl siloxane having a viscosity in the range of from about 100 to 10,000 centistokes, from about 10 to 30 percent of mineral oil, and the remainder comprising an organic solvent; said condensed hydrocarbon resin having a melting point in the range of about 100° to 150°C., and being a member selected from a group consisting of (a) essentially saturated, organic solvent soluble, thermoplastic polymers of styrene and, optionally meta-substituted benzenes, copolymerized with higher alkenes derived from petroleum cracking operations, and (b) partially unsaturated organic solvent soluble, thermoplastic polymers of betapinene or dipentene.

3,914,198

RAPID-SETTING POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 392,591, Aug. 29, 1973, Pat. No. 3,847,859. This application May 24, 1974, Ser. No. 473,053
Int. Cl.² C08K *5/15*
U.S. Cl. 260—30.4 N **14 Claims**

1. A solid, rigid, non-cellular urethane polymer having a density of at least about 1 gram/cc resulting from admixture of the components of a composition comprising

A. an active hydrogen-containing component selected from
1. a polyether polyol having a hydroxyl equivalent weight of between about 75 and about 230 and containing from 3 to about 8 hydroxyl groups per molecule,
2. a dihydroxyl-containing compound having a hydroxyl equivalent weight of less than about 250, and
3. mixtures thereof;

B. an organic polyisocyanate;

C. a modifier component comprising
1. 50–100% by weight of, as a modifier, a cyclic anhydride of a dicarboxylic acid said anhydride being selected from the group consisting of dodecenyl succinic anhydride, tetrahydrophthalic anhydride and methylbicyclo (2.2.1) heptene 2,3-dicarboxylic anhydride, and mixtures thereof;
2. 0–50% by weight of a co-modifier selected from
a. organic liquid compounds having a boiling point above about 150°C,
b. liquid halogenated aliphatic compounds containing a hydroxyl group and having a boiling point of less than about 150°C, or
c. mixtures thereof;

D. a non-amine catalyst for urethane formation;

wherein components (A) and (B) are present in quantities such that the NCO:OH ratio is from about 0.8:1 to about 1.5:1; the quantities of component (C) being from about 10 to about 50 percent by weight based upon the combined weight of components (A), (B) and (C); with the provision that when component (A-2) is employed as the sole component of (A) then component (B) has a functionality of at least about 2.5; and when component (A-1) is an amine initiated polyol and is employed as the sole component of component (A), then component (D) need not be present; and wherein said polymer can be demolded within less than about 5 minutes, without the application of an external source of heat, after admixture of the components of said composition.

3,914,199

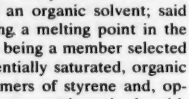
ACETOXSILICON ADHESION PROMOTER AND PRIMER COMPOSITION

Chi-Long Lee, Midland, and Jay R. Schulz, Bangor Twp., Bay County, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

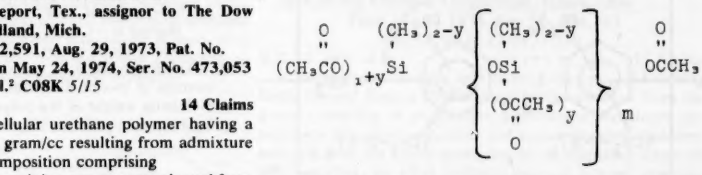
Filed Oct. 12, 1973, Ser. No. 406,065
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C08K *5/07*
U.S. Cl. 260—32.8 SB **19 Claims**

1. A composition under anhydrous conditions consisting essentially of an organic solvent solution of

a. a reaction product obtained by mixing under essentially anhydrous conditions
1. an organosiloxane of the formula



in which A is a monovalent radical selected from the group consisting of vinyl and methyl radicals and k has an average value of from 0 to 20 inclusive where the organosiloxane species having values of k above 20, is present, are in no more than minor amounts and
2. an acetoxysilicon compound of the formula



in which m has an average value of from 0 to 5 inclusive and y is 1 or 2,

(1) and (2) being mixed in proportions to provide a ratio of hydroxyl in (1) to acetoxy in (2) of from 1/14 to ⅔,

b. an alkyl silicate selected from the group consisting of ethylorthosilicate, propylorthosilicate, ethylpolysilicate and propylpolysilicate, and

c. an organotitanate of the formula

$$Ti(OR)_4$$

wherein each —OR is a monovalent radical selected from the group consisting of alkoxy radicals having from 1 to 5 carbon atoms and acetylacetonoxy,

(a) provides 5 to 100 weight percent, (b) provides 0 to 50 weight percent and (c) provides 0 to 50 weight percent, where (a), (b) and (c) equals 100 weight percent, said organic solvent solution being from 50 to 99.9 weight percent of an organic solvent selected from the group consisting of ketones, halogenated hydrocarbons and hydrocarbons all having boiling points no greater than 150°C.

3,914,200

RIGID THERMOSETTING LOAD BEARING COMPOSITIONS

Stanley Oswitch, University Heights; Robert F. Golownia, Northfield, and Kevin K. Kipp, Cleveland Heights, all of Ohio, assignors to Ferro Corporation, Cleveland, Ohio

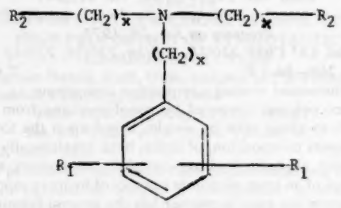
Continuation-in-part of Ser. No. 221,430, Jan. 27, 1972, abandoned, which is a continuation-in-part of Ser. No. 846,592, July 31, 1969, abandoned. This application Apr. 23, 1973, Ser. No. 353,501
Int. Cl. C09j *3/00*
U.S. Cl. 260—40 **20 Claims**

1. A two component system adapted for forming upon interreaction at room temperatures a rigid polyester reaction product, said components being each storable for an appreciа-

ble period of time apart from one another at room temperatures and comprising:

a. a liquid, curable, unsaturated polyester resin containing a sufficient amount of a peroxide catalyst normally adapted to catalyze further polymerization of said polyester resin, and an inhibitor delaying such catalyzation of the resin, said inhibitor being present in an excessive amount of more than 0.02% by weight of the resin and sufficiently more than said 0.02% relative to the amount of said peroxide catalyst to inhibit said catalyzation for at least one week, and

b. an accelerator combination consisting essentially of a metal soap in which the metal is capable of undergoing a redox reaction, and an aromatic tertiary amine having the formula:



in which R_1 represents hydrogen, CH_3, or halogen; R_2 represents alkyl up to 4 carbon atoms, R_3OH in which R_3 is alkylene up to 4 carbon atoms, or phenyl; and in which the R_1's and R_2's may be the same or different and x is 0 or 1, said metal soap and amine being present in a weight ratio of about 1:10 to 1:1, respectively, a sufficient amount of said accelerator combination being present to overcome the inhibition of said inhibitor upon contact of said two components at room temperatures and permit normal catalyzation of the polyester resin by said peroxide catalyst to effect cure of the polyester resin within less than 1 hour.

3,914,201

FLAME AND SMOKE RETARDANT VINYL CHLORIDE AND VINYLIDENE CHLORIDE POLYMER COMPOSITIONS

William J. Kroenke, Brecksville, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 438,759, Feb. 1, 1974. This application June 24, 1974, Ser. No. 482,483

Int. Cl.² C08F 6/00

U.S. Cl. 260—45.75 R **5 Claims**

1. A flame and smoke retardant composition comprising (1) a vinyl chloride or vinylidene chloride polymer and (2) a mixture of MoS_2 and Si_3N_4, said mixture being present in an amount from about 0.5 to about 10 weight parts per 100 weight parts of polymer and having an average particle size from about 100 microns to about 0.5 micron.

3,914,202

EPOXY RESIN COMPOSITIONS CONTAINING 2-CHLORO-1-CHLOROMETHYLETHYL-2,3-EPOXY PROPYL ETHER

Ralph Ray Shelley, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 8, 1974, Ser. No. 468,042

Int. Cl.² C08G 30/04

U.S. Cl. 260—47 EP **8 Claims**

1. An epoxy resin composition comprising

A. a liquid epoxy resin or mixtures thereof having an average of more than one 1,2-epoxy groups per molecule and

B. an effective, but minor amount of 2-chloro-1-chloromethylethyl-2,3-epoxypropyl ether as a reactive diluent.

3,914,203

OIL-SOLUBLE REACTION PRODUCTS OF (A) A HIGH MOLECULAR WEIGHT OLEFIN POLYMER, ACRYLONITRILE, CHLORINE, AN AMINE AND MALEIC ANHYDRIDE WITH (B) AN ALIPHATIC AMINE; AND LUBRICANT COMPOSITIONS CONTAINING THE SAME

Richard J. Lee, Downers Grove, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed June 10, 1974, Ser. No. 477,667

Int. Cl.² C08F 3/02

U.S. Cl. 260—78.4 D **8 Claims**

1. The oil-soluble product prepared by the process comprising (a) reacting from about 0.3 moles to about 2.5 moles of a high molecular weight olefin polymer having an average molecular weight of at least 600, with from about 0.5 moles to about 7.5 moles of acrylonitrile, and from about 0.4 to about 2.0 moles of chlorine or bromine at a temperature of from about 60°F. to about 160°F.; (b) reacting, at a temperature of from about 200°F. to about 350°F. for a period of about 1 to 6 hours, the product of (a) with sufficient amount of a primary aliphatic amine to replace the halogen atoms in the product of reaction (a); (c) reacting the product of (b) with from about 0.2 moles to about 1.5 moles of maleic anhydride at a temperature of from about 200°F. to about 350°F. for a period of about 2–4 hours; and (d) reacting at a temperature of from about 200°F. to about 350°F., the product of reaction (c) with from about 0.2 moles to about 1.5 moles of an aliphatic amine or polyamine containing at least one primary amino group per anhydride function on the reaction product of (c), and recovering the reaction product of (d).

3,914,204

METHOD FOR MAKING HEAT-HARDENABLE THICKENED EPOXY RESIN MASSES

Dietrich Helm, and Horst Schepp, both of Unna, Germany, assignors to Schering AG., Berlin and Bergkamen, Germany

Filed July 19, 1974, Ser. No. 490,058

Claims priority, application Germany, July 28, 1973, 2338430

Int. Cl.² C08G 30/16

U.S. Cl. 260—47 EN **1 Claim**

1. In the method of making a heat-hardenable thickened epoxy resin mass by thickening, at a temperature between about 20°C. and about 120°C. and in the presence of at least one aliphatic, araliphatic, or cycloaliphatic monoamine or diamine, a mixture of:

a. a liquid epoxy resin comprising an aromatic poly-glycidyl ether;

b. finely-divided dicyandiamide; and

c. a tertiary amine accelerator,

said monoamine or diamine being present in an amount providing from about 0.05 to about 0.8 equivalent of amino hydrogen per equivalent of epoxy compound, said dicyandiamide being present in an amount of from about 0.1 mol to about 0.6 mol per equivalent of epoxy compound in excess of that reacting with said monoamine or diamine, and said tertiary amine being present in an amount from about 0.2 to about 2 percent by weight of said epoxy resin; the improvement wherein a portion of said epoxy resin, having an epoxy equivalent weight up to about 400, is first reacted with said aliphatic, araliphatic, or cycloaliphatic monoamine or diamine in an amount of about 0.05 to about 0.3 equivalent of epoxy resin per equivalent of amine to form a hardener adduct, and said hardener adduct is then combined with the balance of said mixture and the mixture is thickened.

3,914,205
REDUCING POLYMER

Marian Corecki, Givataim, and Abraham Patchornik, Nes-Ziona, both of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

Filed Mar. 22, 1974, Ser. No. 453,761
Int. Cl.² C08F *28/00*
U.S. Cl. 260—79 **9 Claims**

1. A reducing polymer comprising dihydrolipoic acid bound to a water-insoluble polymeric amino-group containing carrier.

3,914,206
TERPOLYMER-BUTADIENE-CARBORANYL METHACRYLATE, AND ACRYLIC ACID

Chester W. Huskins, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 30, 1970, Ser. No. 24,018
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C07F *5/02*
U.S. Cl. 260—80.7 **3 Claims**

1. A method of making a terpolymer comprised of the monomers consisting of carboranyl methacrylate, butadiene, and acrylic acid, said method comprising the completing of the process steps of combining and reacting a predetermined amount of said monomers together in an aqueous mixture containing a polymerization initiator, a chain terminating agent, and an emulsifier, said polymerization initiator being the free radical initiator azo-bis-isobutyronitrile, said chain terminating agent being dodecylmercaptan, and said emulsifier being the quaternary ammonium chloride compound, benzylcetyldimethyl-ammonium chloride, said reacting allowed to proceed while under agitation action to form said terpolymer, and separating said terpolymer thus formed.

3. The product made by the method of claim **2** wherein said terpolymer is comprised of the monomer carboranyl methacrylate in amounts from about 15 to about 75 percent by weight of said terpolymer, the monomer butadient in amounts from about 10 to about 80 percent by weight of said terpolymer, and the monomer acrylic acid in amounts from about 2 to about 20 percent by weight of said terpolymer.

3,914,207
PROCESS FOR COPOLYMERIZING CONJUGATED DIENES AND ALPHA-OLEFINS

Jung Wong Kang, Clinton, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Sept. 26, 1974, Ser. No. 509,516
Int. Cl.² C08F *4/44, 236/00*
U.S. Cl. 260—85.3 R **19 Claims**

1. A process for the hydrocarbon solution polymerization of a monomer composition containing 10–90 percent by weight of a conjugated diene and 10–90 percent by weight of an alpha-olefin having 2–8 carbon atoms to produce a copolymer having 5–90 percent of the alpha-olefin in the resultant copolymer comprising the steps of maintaining said monomer composition at a temperature in the range of −30° to 50°C in intimate contact with a catalyst composition consisting essentially of:

a. an aluminum compound of the formula $A1R_3$ where R is hydrogen or a hydrocarbon radical of 1–20 carbon atoms;
b. a metal halide compound having the formula $TiBr_nCl_{4-m}$ or VBr_mCl_{5-m} wherein *n* has a value of 0–4 and *m* has a value of 0–5, and
c. sulfoxide of the formula R_aSOR_b wherein R_a and R_b are hydrocarbon groups of 1–20 carbon atoms or chloroderivatives of said hydrocarbons in which the chlorine is attached to an aromatic nucleus;

the concentration of said titanium or vanadium halide being 0.1–4 millimoles per 100 grams of said monomer composition, said aluminum compound being present in a proportion of 1–4 moles per mole of titanium or vanadium halide, and said sulfoxide being present in a proportion of 0.7–4 moles per mole of titanium or vanadium halide, said polymerization being conducted for a period of at least 1 hour.

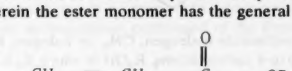
3,914,208
THERMOSET COATINGS FROM NON-REACTIVE POLYMERS

Donald D. Carlos, Middletown, Ky., and Darrell D. Hicks, Jeffersontown, Ky., assignors to Celanese Coatings & Specialties Company, Jeffersontown, Ky.

Filed Nov. 14, 1973, Ser. No. 415,847
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C08F *220/18, 220/26, 220/28, 220/42*
U.S. Cl. 260—86.1 E **7 Claims**

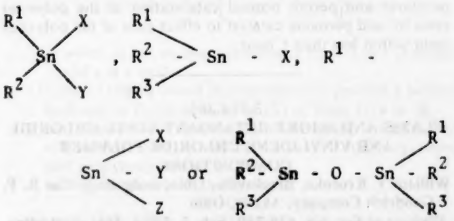
1. A thermoset coating composition comprising:

A. a co-polymer prepared by copolymerizing from about 10% to about 60% by weight, based upon the total copolymer composition, of alpha, beta, ethylenically unsaturated, aliphatic, hydroxy-containing monomers; at least 1 mol of an ester monomer per mol of hydroxy monomer, wherein the ester monomer has the general formula:

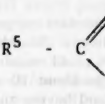


wherein R is an alkyl group having 5 or less carbon atoms; and the remainder, if any, being another monomer copolymerizable therewith;

B. a catalyst selected from the group consisting of:



wherein R^1, R^2 and R^3 are 1 to 18 carbon atom alkyl or acyl groups and wherein X, Y, and Z are



Cl—, Br—, I—, or —OR^6, wherein R^5 and R^6 are 1 to 18 carbon alkyl groups; and

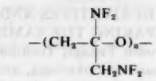
C. a solvent therefor.

3,914,209
DIFLUOROAMINO POLYETHERS

Walter L. Petty, Oakland, Calif., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 423,646, Dec. 31, 1964. This application July 12, 1967, Ser. No. 660,545
Int. Cl. C08g *23/20*
U.S. Cl. 260—88.3 A **3 Claims**

1. A polymer containing high energy groups which comprises a polyether having the formula



wherein n is an integer between 10 and 60.

3,914,210
PROCESS FOR POLYMERIZING BUTADIENE HAVING A HIGH PROPORTION OF SYNDIOTACTIC 1,2-MICROSTRUCTURE

Adel Farhan Halasa, Bath, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Sept. 26, 1974, Ser. No. 509,517
Int. Cl.² C08F *4/44, 36/06, 136/06, 4/52*
U.S. Cl. 260—94.3 **27 Claims**

1. A process for the preparation of polybutadiene having at least 40 percent by weight of syndiotactic microstructure which comprises polymerizing 1,3-butadiene in the liquid phase in the presence of a catalyst composition consisting essentially of:

a. a cobalt-containing component selected from the class consisting of cobalt halides, carboxylates, thiocarboxylates, carbonate and complexes of said halides, carboxylates, thiocarboxylates and carbonate, said complex being formed between the cobalt and a nitrogen, keto or thioketo group in the same compound or with a separate cyclic compound having both a nitrogen and keto or thioketo group therein;

b. a reducing agent having the formula AlR_3 wherein R is hydrogen or a hydrocarbon radical of 1–8 carbon atoms;

c. a sulfur halide selected from the class consisting of $SOCl_2$, S_2Cl_2, SO_2Cl and SCl_2; and,

d. a modifying compound having a group therein selected from the class consisting of amine, aldimine, ketimine, nitro, nitroso, amide, keto, thioketo, phosphoramide and phosphine.

3,914,211
PROCESS FOR MODIFYING DIENE POLYMERS

Anne C. Udding, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 28, 1973, Ser. No. 336,652
Claims priority, application Netherlands, Apr. 24, 1972, 7205492
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C08F *8/32*
U.S. Cl. 260—94.7 N **6 Claims**

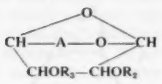
1. A process for modifying polyisoprene into products which can be processed with a filler to unvulcanized polymers having improved mechanical properties which process comprises reacting said polymer with from about 0.05 to about 5 percent by weight on polymer of a mono aryl hydroxylamine derivative of up to fourteen carbon atoms in the absence of those aldehydes or ketones which, in situ, form nitrones with the said hydroxylamine derivatives, at a temperature from about 50°–125°C.

3,914,212
ANHYDROFURANOSE DERIVATIVES AND PROCESSES FOR THEIR MANUFACTURE

Gerhard Baschang, Bettingen; Jaroslav Stanek, Birsfelden; Alberto Rossi, Oberwil, and Alex Sele, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

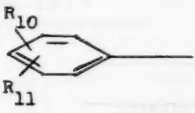
Filed May 23, 1973, Ser. No. 363,287
Claims priority, application Switzerland, May 30, 1972, 7970/72; Sept. 26, 1972, 14046/72; Apr. 17, 1973, 5496/73
Int. Cl.² C07H *15/06, 15/18*
U.S. Cl. 260—209 R **14 Claims**

1. Anhydrofuranose derivatives of the formula I



(I)

wherein R_2 is hydrogen, lower alkyl, lower aminoalkyl, mono- or di-lower alkylamino-lower alkyl, lower alkenyl, (phenyl or naphthyl)lower alkyl, lower alkanoyl, benzoyl, naphthoyl, pyridylcarbonyl, lower alkanesulphonyl, benzenesulphonyl, carbamoyl, lower alkylcarbamoyl or phenyl-carbamoyl, wherein benzene or naphthalenemoieties are unsubstituted in the aromatic nuclei or substituted therein by up to three members of the group consisting of chloro, bromo, lower alkyl, lower alkoxy, trifluoromethyl, hydroxy or lower alkanoyloxy, or at least one of the radicals R_2 and R_3 is the radical of the formula III



(III)

wherein R_9 denotes hydrogen, 3- to 8-membered cycloalkyl or lower alkyl, R_{10} denotes hydrogen, chloro, bromo or trifluoromethyl, R_{11} denotes said phenyl radical defined for R_2, 5- to 8-membered 1-cycloalkenyl, lower alkoxy, lower alkenyloxy, lower alkyl, mono-or di-lower alkylamino, lower alkyleneamino, lower alkenyleneamino, phenylamino or N-phenyl-N-lower alkylamino, pyrrolyl(1), 3,6-dihydro-2-H-1,2-oxazinyl-(2) or 1-oxo-isoindolinyl-(2), and the others of the radicals R_2 and R_3 independently of one another are hydrogen, lower alkyl, lower alkenyl, benzyl, lower alkylbenzyl, lower alkoybenzyl, (chloro or bromo)-benzyl, trifluoromethyl-benzyl or hydroxy-benzyl, or R_2 and R_3 are lower alkylidene or benzylidene, R_3 is hydrogen, lower alkyl, lower alkenyl, or said (phenyl or naphthyl)-lower alkyl, lower alkanoyl, benzoyl or naphthoyl moieties defined for R_2 and —A—O— is —CHOR$_5$—CH_2—O—, wherein R_5 has one of the meanings indicated for R_3, or wherein two of the radicals R_2, R_3 and R_5 together represent lower alkylidene or phenyl-lower alkylidene wherein phenyl is defined as for R_2 and the third of the radicals R_2, R_3 and R_5 is different from hydrogen if the other two of these radicals are hydrogen, and one of the radicals R_2, R_3 and R_5 is different from methyl if the other two of these radicals are methyl, and one of the radicals R_2, R_3 and R_5 is different from acetyl if the other two of the radicals are acetyl, and one of the radicals R_2, R_3 and R_5 is different from p-toluenesulphonyl if the others of these radicals are p-toluenesulphonyl, or pharmaceutically usable non-toxic acid addition salts thereof.

3,914,213
CARDENOLIDO-3-[4'-AMINO-2', 3', 4'-TRIDESOXY-GLYCOSIDES] AND PROCESS FOR THEIR MANUFACTURE

Ulrich Stache, Hofheim; Werner Fritsch, Neuenhain; Werner Haede, Hofheim, and Ernst Lindner, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

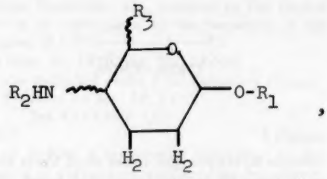
Filed Nov. 1, 1973, Ser. No. 411,747

Claims priority, application Germany, Nov. 4, 1972, 2254060

Int. Cl.² C07J 17/00

U.S. Cl. 260—210.5 11 Claims

1. A cardenolido-3-(4'-amino-2',3',4'-tridesoxyglycoside) of the formula



wherein R_1 stands for a steroid of the 3-hydroxy-cardenolide series, R_2 stands for hydrogen or alkyl having 1 to 4 carbon atoms, alkenyl having 2 to 4 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, phenyl, benzyl, phenylethyl, aliphatic acyl having 1 to 4 carbon atoms, benzoyl, cinnamoyl, or cyclohexanecarboxylic, and R_3 stands for methyl, $—CH_2OR_2$, or hydrogen.

3,914,214
THIOLATION OF POLYSACCHARIDES

Donald Trimnell; Baruch S. Shasha, both of Peoria, and William M. Doane, Morton, all of Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Aug. 24, 1973, Ser. No. 391,184

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C08B 5/14, 31/06, 37/02

U.S. Cl. 260—216 7 Claims

1. A method of preparing thiolated polysaccharides comprising the following steps:

a. pyrolyzing pyridine-free dithiobis(thioformate derivatives of polysaccharides having a dithiobis(thioformate) degree of substitution of from 0.02 to 1.5 at a temperature of from 100° to 200° C.;

b. saponifying the pyrolyzed product resulting from step (a); and

c. neutralizing, recovering, and drying the saponified product resulting from step (b).

3,914,215
BENZODIAZEPINE DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Ryuji Tachikawa; Hiromu Takagi; Toshiharu Kamioka; Tetsuo Miyadera; Mitsunobu Fukunaga, and Yoichi Kawano, all of Hiro, Japan, assignors to Sankyo Company Limited, Japan

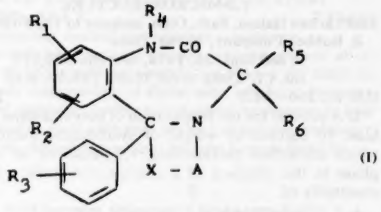
Filed Nov. 14, 1968, Ser. No. 775,914

Claims priority, application Japan, Nov. 27, 1967, 42-76005; Nov. 27, 1967, 42-76007; Nov. 27, 1967, 42-76008; July 1, 1968, 43-45722; Aug. 31, 1968, 43-62699; Aug. 31, 1968, 43-62700; Oct. 18, 1968, 43-76012; Oct. 18, 1968, 43-76013

Int. Cl.² C07D 487/04, 498/04

U.S. Cl. 260—239.3 T 3 Claims

1. A process for the preparation of a compound having the formula



(I)

wherein

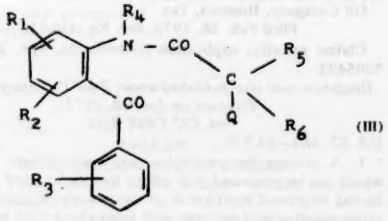
R_1, R_2 and R_3 may be the same or different and each represents hydrogen, lower alkyl, lower alkoxy, halogen, hydroxy, nitro, cyano, lower alkanoyl, benzoyl, toluoyl, naphthoyl, trifluoromethyl, amino, lower alkanoyl amino, benzoylamino, toluoylamino, naphthoylamino, N-mono (lower alkyl) amino, N-di (lower alkyl) amino, lower alkanoyloxy benzoyloxy, carboxyl, lower alkoxycarbonyl, carbamoyl, N-mono (lower alkyl) carbamoyl, N-di (lower alkyl) carbamoyl, lower alkylthio, lower alkylsulfinyl or lower alkylsulfonyl;

R_4 represents hydrogen, lower alkyl, cycloalkyl having from 3 to 6 carbon atoms, phenyl lower alkyl, phenyl, naphthyl, or phenacyl;

R_5 and R_6 may be the same or different and each represents hydrogen, lower alkyl;

A represents polymethylene having from 2 to 4 methylene groups which may be substituted with lower alkyl, hydroxy-substituted lower alkyl or phenyl; and

X represents oxygen atom or sulfur atom which comprises reacting a compound having the formula



(III)

wherein R_1, R_2, R_3, R_4, R_5 and R_6 are as defined above and Q is an acid radical of a hydrohalic acid ester, sulfonic acid ester

or phosphoric acid ester, with a compound having the formula

$$H_2N - A - X - H \qquad (IV)$$

wherein A and X are as defined above.

3,914,216

1-PHENYL-3H-1,4-BENZODIAZEPINE-2,5-(1H,4H)-DIONES

Adolf Bauer, Ingelheim am Rhein; Karl-Heinz Weber, Gau-Algesheim; Peter Danneberg, Ockenheim, and Franz-Josef Kuhn, Bingen, Rhine, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

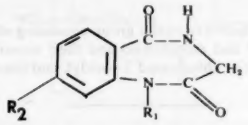
Continuation-in-part of Ser. No. 316,266, Dec. 18, 1962, abandoned. This application Nov. 8, 1973, Ser. No. 413,795

Claims priority, application Germany, Dec. 29, 1971, 2165311

Int. Cl.² C07D *243/14*

U.S. Cl. 260—239.3 D **5 Claims**

1. A compound of the formula



wherein

R_1 is phenyl, fluoro-phenyl, chloro-phenyl, bromo-phenyl, trifluoromethyl-phenyl or nitro phenyl, and

R_2 is fluorine, chlorine, bromine, trifluoromethyl, nitro, amino, cyano or hydroxyl.

3,914,217

PROCESS FOR THE PREPARATION OF LACTAMS

Joseph A. Smith, Richmond, Va., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Nov. 13, 1974, Ser. No. 523,303

Int. Cl.² C07D *201/04*

U.S. Cl. 260—239.3 A **7 Claims**

1. A process of the production of caprolactam by catalytic rearrangement of cyclohexanone oxime in the presence of oleum comprising:

a. continuously feeding a first portion of cyclohexanone oxime consisting of 60 to 80 parts by weight of cyclohexanone oxime having a water content of up to 6 weight percent to a first catalytic rearrangement zone containing a circulating reaction mass having a sulfuric acid to caprolactam weight ratio of 1.33 to 1.80, a free SO_3 content of 2.4 to 14.0 weight percent, and a temperature of 50° to 105°C., said reaction mass being circulated at a rate at least 20 times the rate of feeding said cyclohexanone oxime to said first catalytic rearrangement zone;

b. continuously feeding oleum to said first catalytic reaction zone in amount sufficient to maintain a sulfuric acid to caprolactam weight ratio of 1.33 to 1.80 in said zone, said oleum containing SO_3 in amount sufficient to react with all of the water in the cyclohexanone oxime and maintain the free SO_3 content of the circulating reaction mass at 2.4 to 14.0 weight percent;

c. continuously feeding a portion of the circulating reaction mass from the first catalytic rearrangement zone substantially equivalent to the feed of cyclohexanone oxime to said zone, to a second catalytic rearrangement zone containing a circulating reaction mass having a sulfuric acid to caprolactam weight ratio of at least 1.14, a free SO_3 content of at least 0.82 weight percent, and a temperature of 70° to 100°C., said reaction mass in said second catalytic rearrangement zone being circulated at a rate of at least 20 times the rate of feeding to said second catalytic rearrangement zone said portion of the circulating reaction mass from said first catalytic rearrangement zone;

d. continuously feeding a second portion of the cyclohexanone oxime consisting of 5 to 20 parts by weight of the cyclohexanone oxime having a water content of up to 6 weight percent to said second catalytic rearrangement zone;

e. continuously feeding a portion of the circulating reaction mass from the second catalytic rearrangement zone substantially equivalent to the feed to said zone, to a third catalytic rearrangement zone containing a circulating reaction mass having a sulfuric acid to caprolactam weight ratio of at least 1.00, and a free SO_3 content of at least 0.40 weight percent, and a temperature of 70° to 100°C., said reaction mass in said third catalytic rearrangement zone being circulated at a rate at least 20 times the rate of feeding to said third catalytic rearrangement zone said portion of the circulating reaction mass from said second catalytic rearrangement zone;

f. continuously feeding a third portion of the cyclohexanone oxime consisting of 5 to 20 parts by weight of the cyclohexanone oxime having a water content of up to 6 weight percent to said third catalytic rearrangement zone;

g. continuously withdrawing a portion of the circulating reaction mass from the third catalytic rearrangement zone substantially equivalent to the feed to said zone; and

h. recovering caprolactam from the portion of the circulating reaction mass withdrawn from the third catalytic rearrangement zone.

3,914,218

3-METHYLTHIORIFAMYCINS

Walter D. Celmer; Frank C. Sciavolino, both of New London; Walter P. Cullen, East Lyme, and John B. Routien, Lyme, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed Jan. 9, 1974, Ser. No. 431,845

Int. Cl.² C07D *201/02*

U.S. Cl. 260—239.3 P **4 Claims**

1. 3-Methylthiorifamycin S.

3,914,219

3-ALKYL-4-SULFAMOYL-ANILINE COMPOUNDS

Ansgar Lerch, Kirrlach; Alfred Popelak, Rimbach; Kurt Stach, Mannheim-Waldhof; Egon Roesch, Lampertheim, and Klaus Hardebeck, Ludwigshafen (Rhine), all of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Germany

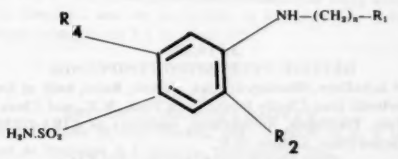
Filed June 18, 1973, Ser. No. 371,212

Claims priority, application Germany, July 1, 1972, 2232457

Int. Cl.² C07D *257/04, 143/80, 333/22, 333/24, 307/52, 307/54*

U.S. Cl. 260—239.6 **15 Claims**

1. A 3-alkyl4-sulfamoyl-aniline compound of the formula:



wherein

R_1 is phenyl, furyl or thienyl;

R_2 is carboxyl or tetrazolyl-(5);

R_4 is a straight-chain or branched alkyl radical of from 2 to 5 carbon atoms;

n is 1 or 2; or

a pharmacologically compatible salt thereof.

3,914,220
1-[5-NITROFURFURYLIDENE)AMINO]-4(AND 5)-PHENYL-2-IMIDAZOLIDINONE

Harry R. Snyder, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

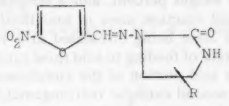
Filed Aug. 24, 1973, Ser. No. 391,210

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07D *233/02*

U.S. Cl. 260—240 A **3 Claims**

1. A compound of the formula:



wherein R is 4- or 5-phenyl.

3,914,221
[(THIOPHOSPHONOTHIO)ACETAMIDO]CEPHALOSPORIN DERIVATIVES

Uwe D. Treuner, Regensburg, and Hermann Breuer, Burgweinting, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

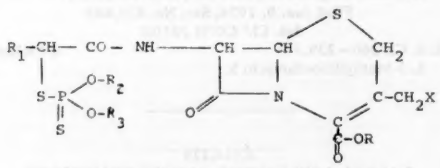
Filed June 1, 1972, Ser. No. 258,687

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

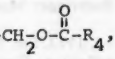
Int. Cl.² C07D *501/20*

U.S. Cl. 260—243 C **8 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, tri(lower alkyl)silyl, tri(lower alkyl)stannyl,



aluminum, alkali metal, alkaline earth metal or tri(lower alkyl)amine; R_1 is phenyl, R_2 and R_3 each is lower alkyl, phenyl-lower alkyl R_4 is lower alkyl, or phenyl-lower alkyl; and X is hydrogen, hydroxy or lower alkanoyloxy.

3,914,222
HETEROCYCLIC SPIRO COMPOUNDS

Karl Schaffner, Binningen; Alex Meisels, Basel, both of Switzerland; Jean Claude Roger, New York, N.Y., and Claus D. Weis, Pfeffingen, Switzerland, assignors to CIBA-GEIGY Corporation, Ardsley, N.Y.

Filed May 2, 1973, Ser. No. 356,545

Claims priority, application Switzerland, May 4, 1972, 6613/72

Int. Cl.² C07D *221/20*

U.S. Cl. 260—247.2 A **8 Claims**

1. A compound which is 1′-(3,4-dichlorobenzyl)-(1RS,2RS,4SR)-spiro[norbornane -2,3′-piperidine] and its pharmaceutically acceptable acid addition salts.

3,914,223
1,2,4,-4H-TRIAZOLE DERIVATIVES

Michael C. Seidel, Levittown; William C. Von Meyer, Willow Grove, and Stanley E. Greenfield, Ambler, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 297,865, Oct. 16, 1972, Pat. No. 3,824,312, which is a continuation of Ser. No. 67,198, Aug. 26, 1970, abandoned. This application Dec. 26, 1973, Ser. No. 428,464

Int. Cl.² C07D *295/22*

U.S. Cl. 260—247.5 E **4 Claims**

1. A compound of the formula

wherein R^2 is selected from the group consisting of (a) 4-pyridyl, 2-pyrimidyl and morpholino and their monochlorinated derivatives and (b) chlorinated 2-pyridyl, and their acid salts.

3,914,224
1,3,5-S-TRIAZINES

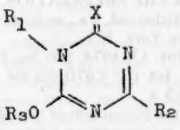
Richard A. Jewell, Landenberg, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Nov. 12, 1973, Ser. No. 414,877

Int. Cl.² C07D *251/26*

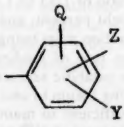
U.S. Cl. 260—248 NS **7 Claims**

1. A compound of the formula:



wherein

R_1 is n-propyl, a branched chain alkyl of 3 through 8 carbon atoms, cycloalkyl of 3 through 8 carbon atoms, cycloalkylalkyl of 4 through 7 carbon atoms, alkenyl of 3 through 4 carbon atoms, alkynyl of 3 through 4 carbon atoms, benzyl or



wherein

Y is hydrogen, halogen, alkyl of 1 through 4 carbon atoms, nitro, alkoxy of 1 through 4 carbon atoms, alkylthio of 1 through 4 carbon atoms, cyano or trifluoromethyl

Z is hydrogen, halogen, methyl, ethyl, nitro, methoxy, or methylthio; and

Q is hydrogen, halogen, or methyl;

R_2 is SR_4 or OR_4 where, when R_1 is phenyl or substituted phenyl, R_4 is methyl or ethyl; and when R_1 is other than phenyl or substituted phenyl, R_4 is alkyl of 1 through 6 carbon atoms, cycloalkyl of 3 through 6 carbon atoms, alkenyl of 3 through 4 carbon atoms, alkynyl of 3 through 4 carbon atoms, or benzyl;

R_3 is methyl or ethyl; and

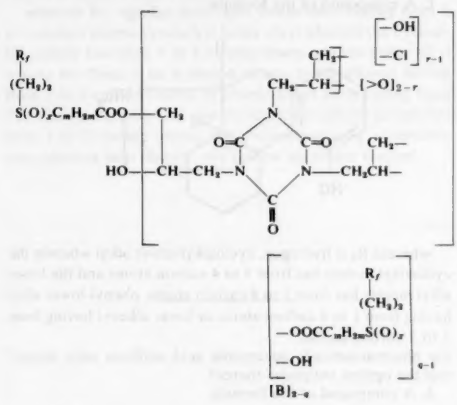
X is oxygen or sulfur.

3,914,225
N-HETEROCYCLIC PERFLUOROALKYLCARBOXYLIC ACID ESTERS

Armin Hiestand, Binningen, and Horst Jager, Bettingen, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jan. 25, 1974, Ser. No. 436,553
Claims priority, application Switzerland, Feb. 2, 1973, 1562/73
Int. Cl.² C07D *251/34, 233/76, 233/34*
U.S. Cl. 260—248 NS **12 Claims**

1. A perfluoroalkylcarboxylic acid ester of the formula



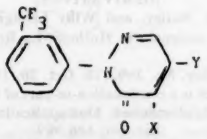
wherein R_f represents a perfluoroalkyl radical with 4 to 18 carbon atoms, r is 1 or 2, B is [—O—] or [—OH Cl—], m is a whole number from 1 to 3, q is 1 or 2 and x is 0, 1 or 2, with x being 0 or 1 if m is 1.

3,914,226
5-CHLOROPYRIDAZONES

Cuno Ebner, Reinach, and Max Schuler, Arlesheim, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 98,123, Dec. 14, 1970, Pat. No. 3,709,885. This application Nov. 16, 1972, Ser. No. 307,330
Claims priority, application Switzerland, Dec. 19, 1969, 18917/69
Int. Cl.² C07D *237/10*
U.S. Cl. 260—250 A **1 Claim**

1. A compound of the formula:



wherein Y is -NHOH, -NHOR₂ or

where R_1 and R_2 are each alkyl of 1 to 4 carbon atoms, and X is chlorine or bromine.

3,914,227
CERTAIN CYCLOALKYL PYRAZINYL KETONES

Alan O. Pittet, Atlantic Highlands; Ranya Muralidhara, Fair Haven; Joaquin F. Vinals, Red Bank, all of N.J.; Alton Dewitt Quinn, Calicoon, N.Y.; Manfred Hugo Vock, Locust, N.J., and Edward J. Shuster, Brooklyn, N.Y., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Oct. 23, 1973, Ser. No. 410,704
Int. Cl.² C07D *241/10*
U.S. Cl. 260—250 B **2 Claims**

1. Pyrazinyl cyclohexyl ketone.
2. Pyrazinyl cyclopentyl ketone.

3,914,228
6-(SUBSTITUTED PHENOXY)TETRAZOLO(1,5-B)PYRIDAZINES

Fred Y. Edamura, Concord, Calif., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 14, 1974, Ser. No. 451,667
Int. Cl.² C07D *237/26*
U.S. Cl. 260—250 AC **4 Claims**

1. A 6-(substituted phenoxy)tetrazolo(1,5-b)pyridazine compound wherein the substituted phenoxy moiety is selected from the group consisting of 4-nitrophenoxy, 4-chlorophenoxy and 4-chloro-6-nitrophenoxy.

3,914,229
NOVEL N-HYDROXYMETHYL COMPOUNDS, COMPOSITIONS CONTAINING SUCH COMPOUNDS AND CELLULOSE-CONTAINING TEXTILE MATERIALS TREATED THEREWITH

James C. Martin, Johnson City; Ronald H. Meen, Kingsport, both of Tenn., and Howard M. Lewis, Dallas, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 102,982, Dec. 30, 1970, Pat. No. 3,772,292. This application June 25, 1973, Ser. No. 373,546
Int. Cl.² C07D *239/00*
U.S. Cl. 260—256.4 F **4 Claims**

1. A composition produced by the process which comprises contacting formaldehyde at a pH of (a) 8 or more or (b) 0.5 to 5 and at a temperature of about −20° to about 100°C. with an intermediate condensate obtained by contacting a urea compound having the formula $R^4—NHCONH_2$ with a saturated aldehyde having the formula $R^3—CHO$ wherein R^4 is hydrogen or lower alkyl and R^3 is methyl, ethyl, propyl, butyl or isobutyl at a pH of 4 or less at a temperature of about 0° to about 150°C., the mole ratio of urea to aldehyde being about 1:1 to about 1:2 and the mole ratio of formaldehyde to the aldehyde being about 2:1 to about 1:2.

3,914,230
BROMACIL/DIURON COMPLEX

Archibald Miller Hyson, Newark, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 159,547, July 2, 1971, abandoned, which is a continuation-in-part of Ser. No. 56,973, July 21, 1970, abandoned. This application Mar. 11, 1974, Ser. No. 449,755
Int. Cl.² C07D *239/54*
U.S. Cl. 260—260 **1 Claim**

1. A bromacil/diuron complex in a molar ratio of 1:1 substantially free of either bromacil or diuron.

3,914,231

(−)(CIS-1,2-EPOXYPROPYL)-PHOSPHONIC ACID AND SALTS THEREOF

David Hendlin, Springfield; Edward O. Stapley, Spotswood, both of N.J.; Sagrario Mochales Del Val, and Justo Martinez Mata, both of Madrid, Spain, assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 69,961, Sept. 4, 1970, abandoned, Division of Ser. No. 728,059, May 9, 1968, Pat. No. 3,639,590, Continuation-in-part of Ser. No. 655,757, July 25, 1967, abandoned, Continuation-in-part of Ser. No. 679,165, Oct. 30, 1967, abandoned. This application July 17, 1973, Ser. No. 378,371

Int. Cl. *C07d 51/70*

U.S. Cl. 260—268 R **22 Claims**

1. (−) (Cis-1,2-epoxypropyl)-phosphonic acid or the pharmaceutically acceptable non-toxic salts thereof.

3,914,232

2-AND 4-ACRYLOXY-N-SUBSTITUTED-MORPHINAN DERIVATIVES

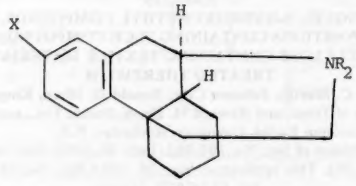
Ernest Mohacsi, Nutley, and Willy Leimgruber, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 299,478, Oct. 20, 1972, Pat. No. 3,810,899, which is a continuation-in-part of Ser. No. 233,715, March 10, 1972, abandoned. This application Feb. 26, 1974, Ser. No. 446,083

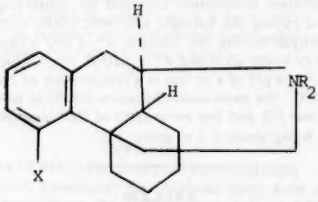
Int. Cl.² C07D *221/28;* **A61K** *31/485*

U.S. Cl. 260—285 **4 Claims**

1. A compound of the formula



and of the formula



wherein R_2 signifies hydrogen, lower alkyl having from 3 to 7 carbon atoms, cycloalkyl-lower alkyl wherein the cycloalkyl moiety has from 3 to 4 carbon atoms and the lower alkyl moiety has from 1 to 4 carbon atoms, phenyl-lower alkyl having from 1 to 4 carbon atoms or lower alkenyl having from 2 to 7 carbon atoms, and X is selected from the group consisting of lower alkanoyloxy having from 2 to 7 carbon atoms and benzoyloxy, the pharmaceutically acceptable acid addition salts thereof and the optical antipodes thereof.

3,914,233

4-HYDROXY-N-SUBSTITUTED MORPHINAN DERIVATIVES

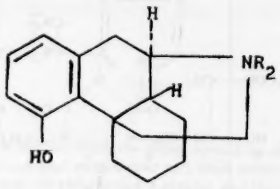
Ernest Mohacsi, Nutley, and Willy Leimgruber, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 299,478, Oct. 20, 1972, Pat. No. 3,810,899, which is a continuation-in-part of Ser. No. 233,715, March 10, 1972, abandoned. This application Feb. 26, 1974, Ser. No. 446,084

Int. Cl.² C07D *221/28;* **A61K** *31/485*

U.S. Cl. 260—285 **6 Claims**

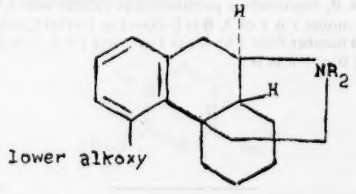
1. A compound of the formula



wherein R_2 is hydrogen, cycloalkyl-lower alkyl wherein the cycloalkyl moiety has from 3 to 4 carbon atoms and the lower alkyl moiety has from 1 to 4 carbon atoms, phenyl-lower alkyl having from 1 to 4 carbon atoms or lower alkenyl having from 2 to 7 carbon atoms,

the pharmaceutically acceptable acid addition salts thereof and the optical antipodes thereof.

4. A compound of the formula



wherein R_2 is hydrogen, cycloalkyllower alkyl wherein the cycloalkyl moiety has from 3 to 4 carbon atoms and the lower alkyl moiety has from 1 to 4 carbon atoms, phenyl-lower alkyl having from 1 to 4 carbon atoms or lower alkenyl having from 2 to 7 carbon atoms, and wherein the lower alkoxy group has from 1 to 7 carbon atoms,

the pharmaceutically acceptable acid addition salts thereof and the optical antipodes thereof.

3,914,234

2-LOWER ALKOXY-N-SUBSTITUTED-MORPHINAN DERIVATIVES

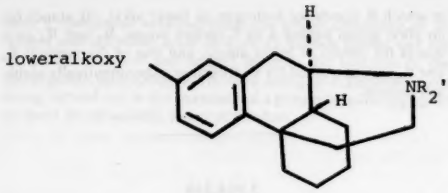
Ernest Mohacsi, Nutley, and Willy Leimgruber, Montclair, both of N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 299,478, Oct. 20, 1972, Pat. No. 3,810,899, which is a continuation-in-part of Ser. No. 233,715, March 10, 1972, abandoned. This application Feb. 26, 1974, Ser. No. 446,089

Int. Cl.² C07D *221/28;* **A61K** *31/485*

U.S. Cl. 260—285 **4 Claims**

1. A compound of the formula



wherein R_2' signifies hydrogen, lower alkyl having from 3 to 7 carbon atoms, cycloalkyl-lower alkyl wherein the cycloalkyl moiety has from 3 to 4 carbon atoms and the lower alkyl moiety has from 1 to 4 carbon atoms, lower alkenyl having from 2 to 7 carbon atoms, or phenyl-lower alkyl having from 1 to 4 carbon atoms, and wherein the lower alkoxy groups has from 1 to 7 carbon atoms, the pharmaceutically acceptable acid addition salts thereof and optical antipodes thereof.

3,914,235

PROCESSES AND INTERMEDIATES FOR QUININE, QUINIDINE, ISOMERS AND DERIVATIVES THEREOF

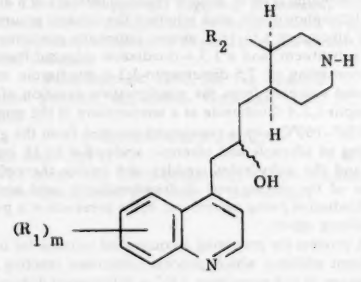
Juerg Albert Walter Gutzwiller, Bettingen, Switzerland, and Milan Radoje Uskokovic, Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 212,774, Dec. 27, 1971, Pat. No. 3,772,302, which is a continuation-in-part of Ser. No. 104,784, Jan. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 837,354, June 27, 1969, abandoned, which is a continuation-in-part of Ser. No. 741,914, July 2, 1968, abandoned. This application Aug. 1, 1973, Ser. No. 384,556

Int. Cl.² C07D *215/12*

U.S. Cl. 260—288 CE **4 Claims**

1. A compound of the formula



wherein m is 0, 1 or 2; R_1 is hydrogen, hydroxy, halogen, trifluoromethyl, methyl, ethyl, propyl, butyl, methoxy or, when m is 2, R_1 with an adjacent R_1, additionally is methylenedioxy; and R_2 is vinyl or ethyl; its antipode or racemate.

3,914,236

1-(IMIDAZOLE-1-YL)-ISOQUINOLINES AND PROCESS FOR PREPARING THEM

Ulrich Lerch, Hofheim, and Ernold Granzer, Kelkheim, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

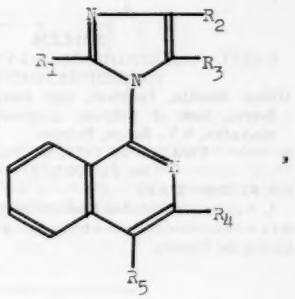
Filed Mar. 25, 1974, Ser. No. 454,713

Claims priority, application Germany, Mar. 26, 1973, 2314985

Int. Cl.² C07D *217/22*

U.S. Cl. 260—288 CE **9 Claims**

1. A 1-(1-imidazolyl)-isoquinoline of the formula



and the physiologically tolerated salts thereof, wherein R_1, R_2, and R_3, which may be the same or different, are hydrogen, alkyl having 1 to 4 carbon atoms, or phenyl, but R_2 and R_3 are not both t-alkyl groups;

R_4 is hydrogen, alkyl having 1 to 4 carbon atoms, phenyl, or chlorine;

and R_5 is hydrogen, alkyl having 1 to 6 carbon atoms, cycloalkyl having 5 to 8 carbon atoms, phenyl, or chlorine, but R_4 and R_5 are not both t-alkyl groups.

3,914,237

5H[1]BENZOPYRANO-[3,4-C]PIPERIDINES

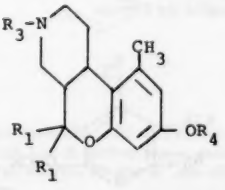
Harry G. Pars, Lexington; Felix E. Granchelli, Arlington, and Raj K. Razdan, Belmont, all of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Division of Ser. No. 870,278, Oct. 30, 1969, Pat. No. 3,635,993, which is a division of Ser. No. 642,223, May 29, 1967, Pat. No. 3,514,464. This application June 28, 1971, Ser. No. 157,658

Int. Cl.² C07D *491/04*

U.S. Cl. 260—293.55 **1 Claim**

1. A compound having the formula:



where R_1 is lower-alkyl; R_3 is hydrogen, lower-alkanoyl, cycloalkyl-lower-alkyl, cycloalkyl-lower-alkanoyl, lower-alkenyl, lower-alkynyl, halo-lower-alkenyl, phenyl-lower-alkyl, phenyl-lower-alkanoyl, phenyl-lower-alkenyl, or phenyl-lower-alkynyl; and R_4 is hydrogen, lower-alkyl, lower-alkanoyl, carbamyl, N-lower-alkylcarbamyl, N,N-di-lower-alkylcarbamyl, or phosphonyl, said lower-alkyl groups containing 1 to 6 carbon atoms and said cycloalkyl-lower-alkyl and cycloalkyl-lower-alkanoyl groups containing from 3 to 8 ring carbon atoms in the cycloalkyl moiety.

3,914,238

4-ARYL-α-(1,4-BENZODIOXAN-2-YL)-4-HYDROXY-1-PIPERIDINEETHANOLS

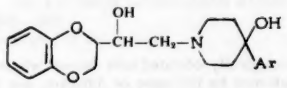
Willem Soudijn, Turnhout, and Ineke van Wijngaarden, Beerse, both of Belgium, assignors to Janssen Pharmaceutica, N.V., Beerse, Belgium

Filed Jan. 18, 1974, Ser. No. 434,477

Int. Cl.² C07D *211/52*

U.S. Cl. 260—293.58 **6 Claims**

1. A compound selected from the group consisting of 4-aryl-α-(1,4-benzodioxan-2-yl)-4-hydroxy-1-piperidineethanols having the formula



the stereochemical optical isomeric forms and the therapeutically active acid addition salts thereof, wherein Ar is a member selected from the group consisting of phenyl and substituted phenyl, the latter being phenyl substituted from 1 to 3 members selected from the group consisting of halo, loweralkyl, loweralkyloxy and trifluoromethyl.

3,914,239

CERTAIN 5-LOWER-ALKYL-PYRIDINE-2-CARBOXYLATES

Hans Kühnis, Basel; Christian Egli, Magden; Kurt Eichenberger, Therwil, and Phyllis Roberta Hedwall, Basel, all of Switzerland, assignors to Ciba Geigy Corporation, Ardsley, N.Y.

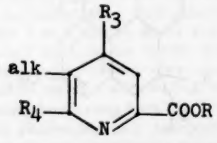
Filed Feb. 9, 1973, Ser. No. 331,147

Claims priority, application Switzerland, Feb. 17, 1972, 2301/72; Sept. 15, 1972, 13543/72; Dec. 22, 1972, 18729/72

Int. Cl.² C07D *213/55*

U.S. Cl. 260—295 R **5 Claims**

1. A compound of the formula



in which R stands for hydrogen or lower alkyl, alk stands for an alkyl group having 4 to 5 carbon atoms, R_3 and R_4 each stands for chloro or lower alkoxy and one of the symbols R_3 and R_4 may also stand for hydrogen or a therapeutically usable salt thereof.

3,914,240

AGRICULTURAL FUNGICIDE

Ryohei Takahashi; Isao Yokomichi; Itaru Shigehara, and Terumasa Komyoji, all of Kusatsu, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

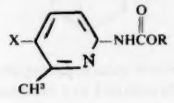
Filed Mar. 5, 1974, Ser. No. 448,205

Claims priority, application Japan, Mar. 10, 1973, 48-27592

Int. Cl.² C07D *213/44*

U.S. Cl. 260—295 CA **2 Claims**

1. A compound of the formula:



wherein X represents chlorine or bromine and R represents methyl, ethyl, or isopropyl.

3,914,241

OIL SOLUBLE DERIVATIVES OF 2,5-DI-MERCAPTO-1,3,4-THIADIAZOLE AND PROCESS FOR PREPARATION THEREOF

John Scotchford Elliott; Gerald John Joseph Jayne, and Rodney Ian Barber, all of Bracknell, England, assignors to Edwin Cooper & Company Limited, Bracknell, England

Filed Apr. 16, 1973, Ser. No. 351,459

Claims priority, application United Kingdom, Apr. 25, 1972, 19048/72

Int. Cl.² Co7D *285/12*

U.S. Cl. 260—302 E **11 Claims**

1. A compound, suitable for use as a lubricant additive, which compound is an oil soluble reaction product of a di-(organo) dithiophosphoric acid, wherein the organo groups are alkyl or alkenyl of 3 to 18 C atoms, optionally containing an alkoxy substituent, and a 1,3,4-thiadiazole selected from the group consisting of 2,5-dimercapto-1,3,4-thiadiazole and a compound resulting from the condensation reaction of 2,5-dimercapto-1,3,4-thiadiazole at a temperature in the range of about 120°–160°C with a compound selected from the group consisting of alkenols and alkenoic acids of 4 to 18 carbon atoms and the anhydrides, amides and imides thereof, the reaction of the di-(organo) di-thiophosphoric acid and the 1,3,4-thiadiazole being carried out in the presence of a peroxide oxidizing agent.

11. A process for preparing a compound suitable for use as a lubricant additive which process comprises reacting at a temperature of not more than 70°C a di-(organo) dithiophosphoric acid, wherein the organo groups are alkyl or alkenyl of 3 to 18 C atoms, optionally containing an alkoxy substitutent, and a 1,3,4-thiadiazole selected from the group consisting of 2,5-dimercapto-1,3,4-thiadiazole and a compound resulting from the condensation reaction of 2,5-dimercapto1,3,4-thiadiazole at a temperature in the range of about 120°–160°C

with a compound selected from the group consisting of alkenols and alkenoic acids of 4 to 18 carbon atoms and the anhydrides, amides and imides thereof; the reaction of the di-(organo) dithiophosphoric acid and the 1,3,4-thiadiazole being carried out in the presence of a peroxide oxidizing agent to form an oil-soluble reaction product.

3,914,242

3-IMINO-1,2-BENZISOTHIAZOLINES

Horst Böshagen, Haan, Rheinland; Walter Geiger, and Hans Medenwald, both of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

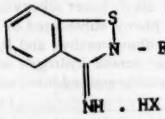
Filed Dec. 16, 1968, Ser. No. 784,249

Claims priority, application Germany, Dec. 27, 1968, 1670967

Int. Cl.² C07D *275/04*

U.S. Cl. 260—304 **7 Claims**

1. An iminobenzisothiazoline of the formula:



wherein:

R^1 is alkyl of 1 to 4 carbon atoms unsubstituted or substituted by fluorine, chlorine or bromine, phenyl unsubstituted or substituted by fluorine, chlorine or bromine or cyclohexyl and

HX is a strong organic or inorganic acid

3,914,243

O-ALKYL-O-[7-SUBSTITUTED-BENZISOXAZOL(3)YL]-(THIONO)-PHOSPHORIC (PHOSPHONIC) ACID ESTERS

Walter Lorenz, Wuppertal; Ingeborg Hammann; Wolfgang Behrenz, both of Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

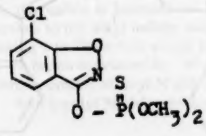
Filed Apr. 24, 1973, Ser. No. 354,032

Claims priority, application Germany, Apr. 27, 1972, 2220629

Int. Cl.² C07D *261/20*

U.S. Cl. 260—307 D **4 Claims**

1. The compound 0,0-dimethyl-0-[7-chloro-benzisoxazol(-3)yl]thionophosphoric acid ester of the formula



(1)

3,914,244

HERBICIDAL 5,6-DISUBSTITUTED-BENZOISOXAZOLE-,7-DIONES

Ian D. Entwistle; Peter J. Williams, and Barry R. J. Devlin, all of Sittingbourne, England, assignors to Shell Oil Company, Houston, Tex.

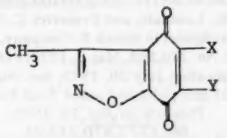
Division of Ser. No. 112,400, Feb. 2, 1973, Pat. No. 3,780,055. This application Sept. 4, 1973, Ser. No. 393,770

Claims priority, application United Kingdom, Feb. 17, 1970, 7527/72

Int. Cl.² C07D *261/20*

U.S. Cl. 260—307 D **4 Claims**

1. A compound of the formula



wherein X represents chloro, bromo, amino, amino mono- or di-substituted by alkyl of up to 6 carbon atoms, or alkanoylamino of 1 to 6 carbon atoms; and Y represents chloro, bromo, or mono-alkylamino of up to 6 carbon atoms.

3,914,245

4(2-PHENYL-O-TOLYL)-3,5-DISUBSTITUTED-4H-1,2,4,-RIAZOLES

Martin Gall, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

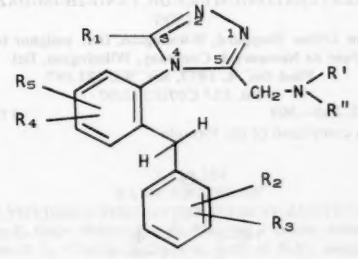
Continuation-in-part of Ser. No. 172,920, Aug. 18, 1971, abandoned. This application Aug. 13, 1973, Ser. No. 387,761

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07D *249/08, 265/30, 211/14, 207/06*

U.S. Cl. 260—308 R **5 Claims**

1. A 4-[α-phenyl-o-tolyl]-5-aminomethyl-3-substituted-4H-1,2,4-triazole of the formula II:



wherein R_1 is hydrogen, alkyl of 1 to 3 carbon atoms, inclusive, cycloalkyl of 3 to 8 carbon atoms, inclusive, phenyl, benzyl, or pyridyl, wherein R′ and R″ are alkyl defined as above, or together

are pyrrolidino, piperidono, or morpholino; wherein R_2, R_3, R_4, and R_5 are hydrogen, alkyl as defined above, halogen, or trifluoromethyl.

3,914,246

TRI-SUBSTITUTED IMIDAZOLES

John J. Baldwin, Lansdale, and Frederick C. Novello, Berwyn, both of Pa., assignors to Merck & Company,, Rahway, N.J.

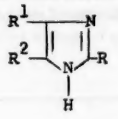
Division of Ser. No. 250,505, May 5, 1972, Pat. No. 3,812,136. This application July 30, 1973, Ser. No. 383,852

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07D *233/54*

U.S. Cl. 260—309 **5 Claims**

1. A compound of the formula:



wherein R is naphthyl, or an aryl radical of the formula:

wherein X is halo, lower alkoxy or lower alkanamido and R^1 and R^2 are the same or different and represent carboxy, lower alkoxycarbonyl, and the non-toxic, pharmacologically acceptable acid addition salts thereof.

3,914,247

2-(PHENYLHALONIUM)-4,5-DICYANO-2H-IMIDAZOLE YLIDS

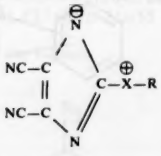
William Arthur Sheppard, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Dec. 4, 1973, Ser. No. 421,597

Int. Cl.² C07D *233/90*

U.S. Cl. 260—309 **4 Claims**

1. A compound of the formula



wherein X is chlorine, bromine or iodine and R is phenyl or naphthyl, any substituent on R being selected from the group consisting of bromine, chlorine, fluorine and iodine, and alkyl of 1–4 carbon atoms.

3,914,248

(4- OR 5-NITROIMIDAZOLYL)-IMIDAZOLE COMPOUNDS

Atso Ilvespää, Neuallschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

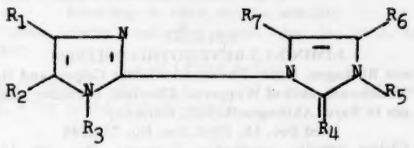
Filed Jan. 31, 1973, Ser. No. 328,816

Claims priority, application Switzerland, Feb. 8, 1972, 1810/72; Dec. 27, 1972, 18867/72

Int. Cl.² C07D *401/14, 403/02, 413/14, 417/14*

U.S. Cl. 260—309.6 **4 Claims**

1. An imidazole compound of the formula



wherein one of R_1 and R_2 is hydrogen or lower alkyl and the other is nitro, R_3 is hydrogen, lower alkyl, hydroxy-lower alkyl, lower alkoxy alkyl, R_4 is thioxo, R_5 is hydrogen, lower alkyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, phenyl or mono-substituted phenyl substituted by lower alkyl, lower alkoxy, halogen or trifluoromethyl, and R_6 and R_7 independently of one another denote hydrogen or lower alkyl, or a therapeutically acceptable acid addition salt thereof.

3,914,249

4-(3,4-DICHLOROPHENYL)-2-(METHYLAMINO)-2-IMADAZOLINE

William L. Matier, and William T. Comer, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Filed Oct. 30, 1973, Ser. No. 411,104

Int. Cl.² C07D *49/34*

U.S. Cl. 260—309.6 **3 Claims**

1. A compound 4-(3,4-dichlorophenyl)-2-(methylamino)-2-imidazoline or a non-toxic pharmaceutically acceptable acid addition salt thereof.

3,914,250

1,4-DIAZEPINO[6,5,4-JK]CARBAZOLES

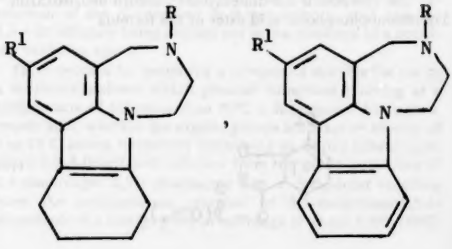
Dong H. Kim, Wayne, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,807

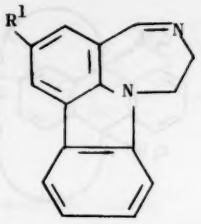
Int. Cl.² C07D *243/14*

U.S. Cl. 260—315 **12 Claims**

1. A compund of the formulae:



and



wherein:

R is hydrogen, lower alkyl, lower alkanoyl, or sodium carboxymethyl; and

R^1 is hydrogen, halogen, lower alkyl, or nitro; or a nontoxic, pharmaceutically acceptable acid addition salt thereof.

3,914,251

CERTAIN TRIFLUOROBUTENYL COMPOUNDS AND THEIR UTILITY AS NEMATOCIDES

Mervin E. Brokke, Moraga, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Division of Ser. Nos. 208,032, Dec. 8, 1971, Pat. No. 3,780,050, and Ser. No. 877,538, Nov. 20, 1969, Pat. No. 3,697,536, which is a division of Ser. No. 490,664, Sept. 27, 1965, Pat. No. 3,513,172. This application Apr. 27, 1973, Ser. No. 354,979

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C07D *209/48*

U.S. Cl. 260—326 NS **1 Claim**

1. The compound N-(3,4,4, trifluoro-3-butenyl)phthalimide.

3,914,252

PREPARATION OF N-IODOCOMPOUNDS

Ronnie D. Gordon, Richardson, Tex., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 124,443, March 15, 1971, abandoned. This application Mar. 5, 1973, Ser. No. 338,115

Int. Cl.[2] C07D *207/12*

U.S. Cl. 260—326.5 FM **4 Claims**

1. A halogen exchange process which comprises reacting a N-halocompound wherein the halo group is bromine or chlorine with an alkyl iodide and recovering a N-iodocompound corresponding otherwise to the N-halocompound and an alkyl halide wherein the halide is bromine or chlorine and corresponding otherwise to the alkyl iodide, said alkyl group of the alkyl iodide having 1 to 30 carbon atoms and said N-halocompound being N-bromosuccinimide; N-chlorosuccinimide; chloroamine; bromoamine; dibutyl-N-chloroamine; diethyl-N-bromamine; butylpentyl-N-chloroamine; cyclohexyl-N-chloroamine; cyclohexyl-N-bromamine; N-chloroacetamide; N-bromoacetamide; N-chlorobenzamide; N-bromobenzamide; N-chlorostearamide; N-bromostearamide; N-chloro-N-methyl aniline; N-chloro-bis(2,6-dichlorophenyl) amine; N,N-dichloro-β-napthyamine; N,N-dichlorobenzenesulfonamide; N-chlorobenzenesulfonamide; N-bromo-bis (phenylsulfonyl) amine; N-chlorohexanesulfonamide; N-bromo-N-butyl cyclohexyl amine; N-chloro-2-hydroxyethylamine; N,N-dibromo-2-hydroxyethylamine; N-bromoethyleneimine; N-chloro-dioctadecylamine; N-chloropiperidine; N-bromo-N-acetylacetamide; N-bromophthalimide; N-chlorobutyrolactam; N,N′-dichlorodiketopiperazine; poly(N-chloroethyleneimine); N-chlorinated proteins; N,N′-dibromohexamethylene diamine; N-chloro-n-heptyl-p-chloroaniline; N-chloro-N-n-butylbenzamide; N,N,N′,N′-tetrachloroethylene diamine; or N-N′-dibromohexamethylene diamine.

3,914,253

5-OXO-6-SUBSTITUTED-CYCLOPENT-[F]-INDOLE-2-CARBOXYLIC ACIDS

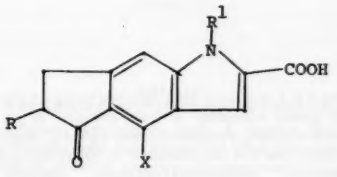
Edward J. Cragoe, Jr., Lansdale, and Otto W. Woltersdorf, Jr., Chalfont, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Mar. 4, 1974, Ser. No. 448,151

Int. Cl.[2] C07D *209/18*

U.S. Cl. 260—326.13 R **5 Claims**

1. A compound having the structural formula:



wherein R is lower alkyl or cycloalkyl; R^1 is hydrogen or lower alkyl; and X is lower alkyl or halogen; and the nontoxic pharmaceutically acceptable salt, lower alkyl ester, carboxamide, mono-N-lower alkyl carboxamide, di-N-lower alkyl carboxamide, piperidide and morpholide derivatives thereof.

3,914,254

BASIC ESTERS OF POLYHYDRO-2-PHENANTHRYLIDENE-ACETIC ACIDS

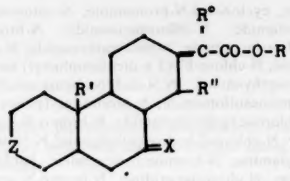
Philip E. Shaw, Winter Haven, Fla.; Sol J. Daum, Albany, and Robert L. Clarke, Bethlehem, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 585,762, Oct. 11, 1966, Pat. No. 3,592,838. This application Nov. 25, 1969, Ser. No. 879,921

Int. Cl. C07d *71/00*

U.S. Cl. 260—327 M **10 Claims**

1. A compound of the formula



wherein:

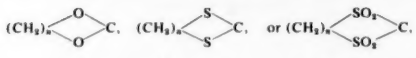
R is amino-lower-alkyl wherein amino is unsubstituted amino, lower-alkylamino di-lower-alkylamino, polymethylenimino of 5–7 ring members or lower-alkylated derivatives thereof, 4-morpholinyl or lower-alkylated derivatives thereof, or 1-piperazinyl or lower-alkylated derivatives thereof;

R′ is hydrogen, lower-alkyl or hydroxy;

R″ and R° are hydrogen or lower alkyl;

X is H_2, (H)(OH), (H)(O-acyl) or =O; and

Z is O=C, (HO)CH, (acyl-O)CH, CH_2, (lower-alkyl)-C(OH), (lower-alkoxy)CH, (halogen)CH, $H_2NC(=NH)NHN=C$, $(O_2NO)CH$, $(C_6H_5CH_2S)_2C$, $(C_6H_5CH_2SO_2)_2C$, [(lower-alkyl)$_3$N]CH, (piperidino)CH, (pyrrolidino)CH, 4-hydroxypiperidino)CH,



where *n* is 2 or 3, acyl, each instance being selected from the group consisting of lower-alkanoyl of up to 12 carbon atoms, cycloalkyl-lower-alkanoyl wherein cycloalkyl has 5–6 ring members, benzoyl, phenyl-lower-alkanoyl, phenyl-lower-alkenoyl, phenoxy-lower-alkanoyl, carbamyl, N-lower-alkylcarbamyl, N-phenylcarbamyl, N,N-di-lower-alkylcarbamyl, nicotinoyl and isonicotinoyl, and wherein the phenyl group of any of the acyls can be unsubstituted or substituted by lower-alkyl, lower-alkoxy, halogen or nitro;

B. a compound of the above formula having a double bond in the 8,8a-position or the 8a,9-position; or

C. a compound of the above formula wherein the exocyclic double bond in the 2-position is saturated.

3,914,255

ANHYDRIDE OF ANTHRACENE DERIVATIVE

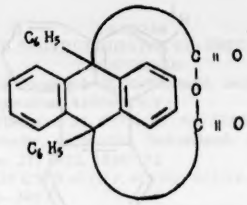
Desmond Sheehan, Hamden, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 766,989, Oct. 11, 1968, Pat. No. 3,637,784, which is a division of Ser. No. 489,748, Sept. 23, 1965, Pat. No. 3,470,103. This application Dec. 16, 1970, Ser. No. 98,944

Int. Cl.² C07D *313/08*

U.S. Cl. 260—333 **1 Claim**

1. A compound of the formula:



3,914,256

INTERMEDIATE FOR RHODOXANTHIN

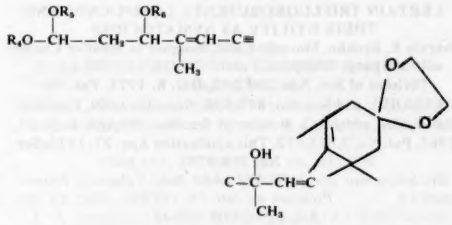
Joseph Donald Surmatis, and Armin Walser, both of West Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 153,090, June 14, 1971, Pat. No. 3,830,844, which is a division of Ser. No. 826,022, May 19, 1969, Pat. No. 3,624,105, which is a division of Ser. No. 617,827, Feb. 23, 1967, Pat. No. 3,466,331. This application May 20, 1974, Ser. No. 471,530

Int. Cl.² C07D *317/22*

U.S. Cl. 260—340.9 **1 Claim**

1. A compound of the formulae:



wherein R_4, R_5 and R_6 are lower alkyl.

3,914,257

PURPUROMYCIN ITS DERIVATIVES AND PREPARATION THEREOF

Hermes Pagani; Carolina Coronelli; Maria Rosa Bardone, all of Milan, and Giancarlo Lancini, Pavia, all of Italy

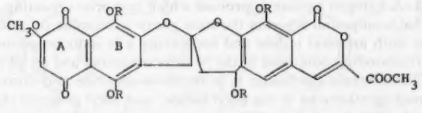
Filed Mar. 20, 1974, Ser. No. 453,111

Claims priority, application United Kingdom, Mar. 19, 1973, 13123/73

Int. Cl.² C07D *407/10, 407/14*

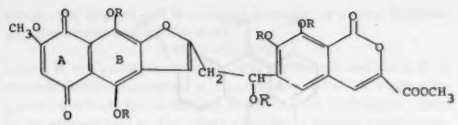
U.S. Cl. 260—343.2 R **10 Claims**

1. A compound designated by the formula



wherein each R represents H or —$COCH_3$.

3. A compound designated by the formula



wherein each R represents H or —$COCH_3$.

3,914,258

NEW OXABICYCLONONANES

Robert Burns Woodward, Cambridge, Mass., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

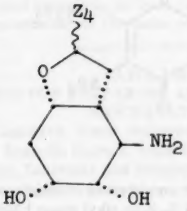
Filed Feb. 2, 1973, Ser. No. 329,249

Claims priority, application Switzerland, May 10, 1972, 6935/72

Int. Cl. C07d *307/78*

U.S. Cl. 260—346.2 R **7 Claims**

1. A compound of the formula VIII



(VIII)

wherein Z_4 represents a member of a group consisting of a free hydroxyl group, a hydroxyl group etherified by a lower alkanol, a lower alkanol containing halogen or phenyl, a lower alkanol, in which the methylene group in the α-position is replaced by oxygen, a cycloalkanol with 5 to 7 carbon atoms, a cycloalkanol with 5 to 7 carbon atoms in which the methylene group in the α-position is replaced by oxygen, or by a tri-lower alkyl-silyl group, and a hydroxyl group esterified with a lower alkanecarboxylic acid, a halo-substituted lower alkanecarboxylic acid, oxalic acid, malonic acid, benzoic acid, benzoic acid substituted by methyl, phenyl, nitro or halogen or benzene dicarboxylic acid, and the optical antipodes, racemates and acid addition salts thereof.

3,914,259

DITHIO-SUBSTITUTED CARBAMATES

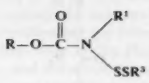
Melancthon S. Brown, deceased, late of Berkeley, Calif., and by Gustave K. Kohn, administrator, Berkeley, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 250,908, May 8, 1972, Pat. No. 3,843,689, which is a continuation-in-part of Ser. Nos. 88,105, Nov. 9, 1970, Pat. No. 3,679,733, and Ser. No. 189,732, Oct. 15, 1971, abandoned. This application July 11, 1974, Ser. No. 483,582

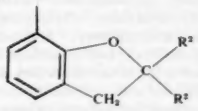
Int. Cl. C07d *5/36*

U.S. Cl. 260—346.2 R **10 Claims**

1. A compound of formula



wherein P is an organo group of 1 to 20 carbon atoms and free from nonaromatic unsaturation selected from: (1) alkyl, (2) cycloalkyl, (3) phenyl, (4) naphthyl, (5) alkylphenyl, (6) alkylnaphthyl, (7) phenalkyl, (8) naphthalkyl, (9) phenyl, naphthyl, alkylphenyl, alkylnaphthyl, phenalkyl or naphthalkyl substituted with 1 to 2 fluoro, chloro, bromo, nitro, alkoxy of 1 to 5 carbon atoms, alkylthio of 1 to 3 carbon atoms or dialkylamino in which the alkyl individually contains 1 to 3 carbon atoms, and (10) 2,3-dihydro-7-benzofuranyl of the formula



wherein R^2 individually is hydrogen or alkyl of 1 to 6 carbon atoms; R^1 is hydrogen or alkyl of 1 to 10 carbon atoms; and R^3 is alkyl of 1 to 10 carbon atoms, haloalkyl of 1 to 2 carbon atoms and 1 to 5 chloro or bromo, or phenyl substituted with up to 2 fluoro, chloro, bromo or alkyl of 1 to 4 carbon atoms.

3,914,260

ARTHROPOD MATURATION INHIBITORS

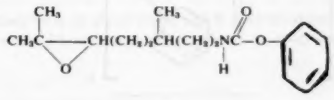
Meyer Schwarz, Kensington; Philip E. Sonnet, Bowie, and Nobel Wakabayashi, New Carrollton, all of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 104,781, Jan. 7, 1971, Pat. No. 3,824,319. This application Apr. 6, 1973, Ser. No. 348,843

Int. Cl.² C07D *303/46*

U.S. Cl. 260—348 A **1 Claim**

1. A compound of the formula



3,914,261

AZIDO PHOTOPOLYMERS

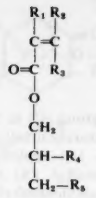
Edward H. Parker, Ballwin; Edward M. Harris, Webster Groves, and Jim D. Meador, Bridgeton, all of Mo., assignors to Western Litho Plate & Supply Co., St. Louis, Mo.

Division of Ser. No. 272,796, Jan. 18, 1972, Pat. No. 3,852,256. This application Nov. 13, 1973, Ser. No. 415,355

Int. Cl.² C07D *117/00*

U.S. Cl. 260—349 **4 Claims**

1. A compound having the structure:



wherein R_1, R_2, and R_3 are each selected from the group consisting of hydrogen, halogen, and lower alkyl and at least one of R_4 and R_5 is selected from the group consisting of azidobenzoyloxy and azidonaphthoyloxy, the other of R_4 and R_5 being selected from the group consisting of hydroxyl, halogen, alkoxy, aryloxy, aralkoxy, alkoxyalkoxy, aryloxyalkoxy, alkoxyaryloxy, aryloxyaryloxy, alkylacyloxy, arylacyloxy, alkenylacyloxy, aralkenylacyloxy, heterocyclic substituted acyloxy, azidobenzoyloxy and azidonaphthoyloxy, wherein the terms alk- and alkyl in the definition of R_4 and R_5 designate groups having one to ten carbon atoms, the terms, ar- and aryl designate carbocyclic aryl groups having one to ten carbon atoms, the term acyl designates an organic acid residue consisting of one to ten carbon atoms, and the heterocyclic substituent of heterocyclic substituted acyloxy is selected from the group consisting of furyl, thienyl, indolyl, and indenyl.

3,914,262

AZIDO FORMATES

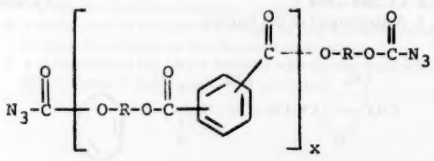
James N. Haynes, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Division of Ser. No. 425,906, Dec. 18, 1973, which is a division of Ser. No. 231,741, March 3, 1972, Pat. No. 3,814,657, which is a division of Ser. No. 93,399, Nov. 27, 1970, Pat. No. 3,686,231, which is a continuation-in-part of Ser. No. 887,382, Dec. 22, 1969, abandoned. This application Feb. 12, 1975, Ser. No. 549,229

Int. Cl.² C07C *117/00*

U.S. Cl. 260—349 **1 Claim**

1. An omega-hydroxyalkyl phthalate azidoformate having the formula



where R is an alkylene radical containing 2 to 10 carbon atoms and *x* is an integer from 1 to 10.

3,914,263

TETRAHYDROANTHRAQUINONE OXIMES AND PROCESS FOR THEIR PREPARATION

Tibor Somlo, Birsfelden, and James Murphy, Riehen, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

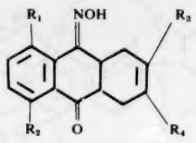
Filed Mar. 13, 1974, Ser. No. 450,913

Claims priority, application Switzerland, Mar. 22, 1973, 4170/73

Int. Cl.² C07C *49/64*

U.S. Cl. 260—351 **2 Claims**

1. Tetrahydroanthraquinone oximes of the formula



wherein R_1 and R_2 each independently represents hydrogen, chlorine, or nitro, and R_3 and R_4 each independently represents hydrogen, chlorine or methyl.

3,914,264

2-LOWER ALKOXY-3-(LOWER ALKYLTHIO)-1,4-NAPHTHOQUINONE

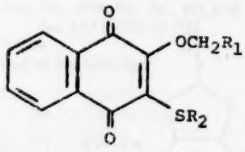
Joseph William Marsico, Jr., Pearl River, and Leon Goldman, Nanuet, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 30, 1975, Ser. No. 545,686

Int. Cl.² C07C *149/32*

U.S. Cl. 260—396 R **9 Claims**

1. A compound selected from the group consisting of those of the formula:



wherein R_1 is hydrogen or an unbranched alkyl group having up to 5 carbon atoms and R_2 is an alkyl group having up to 6 carbon atoms.

3,914,265

DIALKYLAMINOSULFUR TRIFLUORIDES AS FLUORINATING AGENTS

William Joseph Middleton, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Dec. 11, 1972, Ser. No. 314,022

Int. Cl.² C07D *501/20*

U.S. Cl. 260—397.3 **4 Claims**

1. A process for producing a fluorinated compound comprising contacting a compound of the formula

wherein each of R and R^1, alike or different, is a primary alkyl group of up to 4 carbon atoms or when taken together are $-(CH_2)_4-$ or $-(CH_2)_5-$; with a monomeric alcohol under substantially anhydrous conditions at a temperature range of $-100°$ to $+100°C$.

3,914,266

COPPER COMPLEX

Allan S. Hay, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,296

Int. Cl.² C07F *1/08*

U.S. Cl. 260—438.1 **11 Claims**

1. A crystalline, copper salt complex with an amine wherein the molar ratio is one mole of copper salt to one mole of

amine, the copper salt is cuprous bromide or cupric bromide and the amine has the formula:

R'HN—R—NHR',

where R is C_{2-4}-alkylene or C_{3-7}-cycloalkylene and each R' is independently isopropyl, a C_{4-8}-tertiary alkyl or cycloalkyl group in which the α-carbon atom has no hydrogens, there being at least two and no more than three carbon atoms separating the two nitrogen atoms.

3,914,267

PRODUCTION OF ISOCYANATES BY THERMAL DECOMPOSITION OF AROMATIC HYDROXAMIC ACID HALIDES

Robert Allan Campbell Rennie; John Crosby, and Robert Michael Paton, all of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Nov. 6, 1972, Ser. No. 303,815

Claims priority, application United Kingdom, Nov. 8, 1971, 51716/71

Int. Cl.² C07C *118/00*

U.S. Cl. 260—453 P **21 Claims**

1. In a process for the production of aromatic isocyanates by the thermal decomposition of an aromatic hydroxamic acid halide, the improvement comprising the employment as starting material a solution in an appropriate solvent of an aromatic compound selected from aromatic hydrocarbons and compounds which contain at least two benzene rings linked together to form an ether, thioether, sulphone, phosphate or phosphite and containing at least two hydroxamic acid chloride groups attached to the same or different aromatic rings.

3,914,268

PROCESS FOR PREPARING AROMATIC ORGANIC ISOCYANATES

Takeshi Yamahara, Kobe; Schichird Takamatsu, Takatsuki; Takashi Deguchi, Ibaragi; Masahiro Usui, Takatsuki; Kenichi Hirose, Takatsuki, and Hiroshi Yoshihara, Takatsuki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Mar. 7, 1973, Ser. No. 338,866

Claims priority, application Japan, Mar. 7, 1972, 47-23699; Apr. 5, 1972, 47-34691; Apr. 25, 1972, 47-41831; Aug. 16, 1972, 47-82332; Aug. 18, 1972, 47-83074

Int. Cl.² C07C *118/06*

U.S. Cl. 260—453 PC **16 Claims**

1. In the production of an aromatic organic isocyanate by contacting an aromatic nitro compound and carbon monoxide in the presence of a catalyst system comprising a platinum group metal compound selected from the group consisting of a halide or an oxide of palladium rhodium, iridium, ruthenium, platinum or osmium, the improvement wherein said catalyst includes at least one additional constituent selected from the group consisting of water, hydrogen, boric acids, formic acid, oxalic acid and formaldehyde, the molar ratio of said additional catalytic constituent with respect to said platinum group metal compound being from 0.01 to 10.

3,914,269

STORAGE STABLE CRUDE ISOCYANATES AND PRODUCTION THEREOF

Arthur Nersasian, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 10, 1973, Ser. No. 423,018

Int. Cl.² C07C *118/02, 119/078*

U.S. Cl. 260—453 PH **8 Claims**

1. In a process wherein an aromatic diamine is reacted with phosgene to form an undistilled diisocyanate-containing phosgenation product which also contains carbodiimide impurities, and thereafter the phosgenation solvent, unreacted phosgene, and by-products hydrogen chloride is removed from said undistilled diisocyanate-containing phosgenation product, the improvement comprising adding to the latter a weak acid in an amount of 1 to 3.5 moles of weak acid acidic proton per mole of carbodiimide, and raising the temperature, whereby substantially all of the carbodiimides are converted in two stages to an acyl biuret, the first stage taking place at a temperature of from 50° to 100°C., and the second stage at a temperature of from 100° to 160°C., and recovering a substantially storage-stable undistilled phosgenation product.

3,914,270

S-(4-CHLOROBENZYL)-N,N-DIETHYLTHIOLCARBAMATE

Makoto Konnai, Ogasa; Hiroshi Kamata, and Masaru Kado, both of Shimizu, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 123,881, March 12, 1971, Pat. No. 3,846,115, which is a continuation of Ser. No. 19,546, March 19, 1970, Pat. No. 3,582,314, which is a continuation of Ser. No. 651,148, July 5, 1967, abandoned. This application Nov. 5, 1973, Ser. No. 412,898

Claims priority, application Japan, Feb. 10, 1967, 42-8153; Mar. 27, 1967, 42-18774

Int. Cl.² C07C *155/02*

U.S. Cl. 260—455 A **1 Claim**

1. S-(4-chlorobenzyl)-N,N-diethylthiolcarbamate.

3,914,271

BIODEGRADABLE SULFATE DETERGENTS

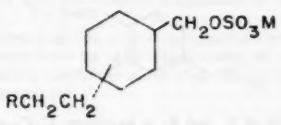
Herman S. Bloch, Skokie, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 277,837, Aug. 3, 1972, Pat. No. 3,867,432. This application Dec. 4, 1974, Ser. No. 529,317

Int. Cl.² C07C *141/02*

U.S. Cl. 260—458 **6 Claims**

1. A novel biodegradable detergent having the formula:



in which M is an alkali metal and R is an alkyl group of from 1 to about 14 carbon atoms.

3,914,272

ALKYL ARYLSULFONATE EXCHANGE PROCESS

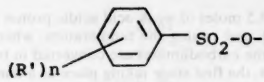
Charles M. Starks, Ponca City, Okla., and Owen Portwood, Jr., Janesville, Wis., assignors to Continental Oil Company, Ponca City, Okla.

Filed July 2, 1973, Ser. No. 371,230

Int. Cl.² C07C *143/68*

U.S. Cl. 260—456 P **7 Claims**

1. A process for exchanging alkyl moieties between compounds which comprises reacting a lower alkyl aryl sulfonate with a higher alkyl halide at temperatures in the range of 0°C to 200°C in the presence of at least 0.01 weight percent of an organic quaternary salt based on the total alkyl halide and alkyl aryl sulfonate; said lower alkyl aryl sulfonate being defined by the formula



wherein *n* is zero or one; R′ is halogen or C_1 to C_4 alkyl group, and R″ is a C_1 and C_4 alkyl group; said higher alkyl halide being defined by the formula RX wherein R is a straight or branch chain alkyl grup having 6 to 40 carbon atoms and X is chlorine, bromine, or iodine; said alkyl moieties being exchanged being R and R″; and said organic quaternary salt being defined by the formula

$(R_1R_2R_3R_4M)^+ X^-$

wherein M is a pentavalent ion of an element selected from the group consisting of nitrogen and phosphorus; each of R_1, R_2, R_3 and R_4, independently, is an alkyl group having 1 to 30 carbon atoms, a phenyl group, a benzyl group, or an alkyl substituted benzyl group wherein the alkyl group has 1 to 30 carbon atoms, and X is hydroxide, bromine, chlorine, iodine, sulfate, para-toluene sulfonate or acetate.

3,914,273

METHINE COMPOUNDS

Tsuneo Ikeda, Toyonaka; Katsunobu Sato, Minoo, and Hiroshi Sugiyama, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

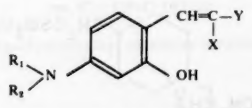
Filed Dec. 29, 1972, Ser. No. 319,816

Claims priority, application Japan, Apr. 14, 1972, 47-37916; Dec. 28, 1972, 47-3484

Int. Cl.² C07C *121/80*

U.S. Cl. 260—465 D **3 Claims**

1. A compound of the formula,



wherein each of R_1 and R_2 is hydrogen, C_1-C_4 alkyl, C_1-C_4 alkyl substituted by chlorine, hydroxy, methoxy, acetoxy, cyano, carbomethoxy or phenyl, or cyclohexyl, X is cyano, and Y is carbamoyl or cyano.

3,914,274

CYANOBENZYL CYCLOPROPANE CARBOXYLATES

Robert J. G. Searle, Rodmersham Green; Roger E. Woodall, Borden, and Michael J. Bull, Lower Halstow, all of England, assignors to Shell Oil Company, Houston, Tex.

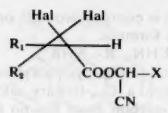
Filed May 13, 1974, Ser. No. 469,134

Claims priority, application United Kingdom, May 15, 1973, 22970/73

Int. Cl.² C07C *121/66*

U.S. Cl. 260—465 D **4 Claims**

1. A compound of the formula



wherein Hal represents a chlorine atom;

R_1 and R_2 each represents an alkyl group of 1 to 6 carbon atoms; and

X represents a phenyl group optionally substituted by one or more chlorine atoms by one or more alkyl groups of 1 to 6 carbon atoms or by a phenoxy, tolyloxy propargyloxy or benzyl group.

3,914,275

BORATE ESTERS PREPARED BY SUCCESSIVE REACTIONS OF BORIC ACID WITH GLYCOL

Arthur W. Sawyer, Hamden, and David A. Csejka, Orange, both of Conn., assignors to Olin Corporation, New Haven, Conn.

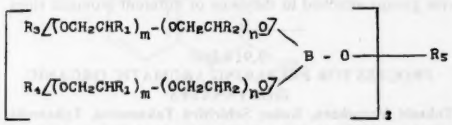
Division of Ser. No. 87,306, Nov. 5, 1970, Pat. No. 3,729,497, which is a division of Ser. No. 653,337, July 14, 1967, Pat. No. 3,637,794. This application Jan. 31, 1973, Ser. No. 328,210

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07F *5/04*

U.S. Cl. 260—462 R **2 Claims**

1. A borate ester of the formula:



where R_1 and R_2 are independently selected from the group consisting of hydrogen and methyl; R_3 and R_4 are each an independently selected alkyl group having from 1 to 20 carbon atoms; R_5 is the organic residue exclusive of reactive hydroxyl groups of a thioglycol selected from the group consisting of thiodiethylene glycol and thiodipropylene glycol and *n* and *m* are positive integers whose sum is from 2 to 20.

3,914,276

PREPARATION OF DISPERSE BISANIL DYES DERIVED FROM DIAMINOMALEONITRILE

Robert Walter Begland, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 3, 1974, Ser. No. 430,414

Int. Cl.² C09B *55/00*

U.S. Cl. 260—465 E **3 Claims**

1. One-step process of preparing the symmetrical bisanil dye of the formula $Ar_1CH{=}N{-}C(CN){=}C(CN){-}N{=}CH{-}Ar_2$ wherein Ar_1 and Ar_2 are the same and are selected from phenyl and naphthyl groups containing 0–3 substituents selected from NO_2, halogen, CN, C_{1-4} alkyl, C_{1-4} alkoxy, OCH_2-phenyl, phenyl, CF_3, OH, OC_{1-4} alkylene-$N(C_{1-4}$ alkyl$)_2$, C_{2-4} alkylene-Cl, $NHCONH_2$, NHCOA, $NHSO_2A$, SR_3, SO_2R_3, NHR_1, $NHCOC_{1-4}$ alkylene-B and $-NR_1R_2$ wherein:

a. R_1 is C_{1-4} alkyl or C_{2-4} alkylene-R_3;

b. R_2 is C_{1-4} alkyl, C_{2-4} alkylene-R_4 or, if Ar_1 or Ar_2 is phenyl, C_3 alkylene attached to a phenyl position which is ortho to the position to which the nitrogen is attached;

c. R_3 is CN, halogen, OH, phenyl, C_{1-4} alkoxy, OC_{1-4} alkylene-CN, CO_2A, OCOA, OCONHA or CO_2C_{1-4} alkylene-OCOA;

d. R_4 is CN, halogen, OH, phenyl, OC_{1-4} alkylene-CN, CO_2A, OCOA, CO_2C_{1-4} alkylene-OCOA, SO_2A, phthalimido, succinimido, glutarimido, $OCOCH{=}CH_2$, $CH_2{-}CH(OCOA)CH_2OA$ or $CH_2CH(OCONHA)CH_2OA$;

e. A is C_{1-4} alkyl or R_5;
f. B is halogen, C_{1-4} alkoxy or R_5;
g. R_5 is phenyl containing 0-2 substituents selected from C_{1-4} alkyl, C_{1-4} alkoxy, halogen, NO_2, CN, C_{1-4} alkyl - CONH and NR_6R_7 wherein each of R_6 and R_7 is independently selected from H and C_{1-4} alkyl, with at least one of R_6 and R_7 being C_{1-4} alkyl; and
h. R_8 is C_{1-4} alkyl, C_2H_4OH, C_{5-8} cycloalkyl or R_5,

which process comprises heating diaminomaleonitrile and at least two molar equivalents of the aromatic aldehyde Ar_1CHO in the presence of glacial acetic acid to produce the symmetrical/dye of the formula

$$Ar_1CH{=}N{-}C(CN){=}C(CN){-}N{=}CH{-}Ar_2.$$

3,914,277

HYDROCARBON RECOVERY PROCESS

William Laurence Wood, Farnham, England, assignor to Davy Powergas Limited, Teeside, England

Filed Mar. 16, 1972, Ser. No. 235,305
Claims priority, application United Kingdom, Mar. 19, 1971, 7287/71
Int. Cl.² C07C *120/14, 121/32*
U.S. Cl. 260—465.3 **17 Claims**

1. In a process for the ammoxidation of propane or isobutane in which the effluent from the reaction contains unreacted propane or isobutane, carbon oxides, nitrogen, and acrylonitrile or methacrylonitrile as desired product, in which said desired product is removed from the reaction effluent, and in which unreacted propane or isobutane is separated from carbon oxides and nitrogen in the reaction effluent and recycled to the reaction, the improvement which comprises contacting said reaction effluent from which said desired product has been removed with liquid absorbent to absorb unreacted propane or isobutane and none or only a minor portion of said carbon oxides and nitrogen, contacting resulting liquid absorbent containing propane or isobutane with nitrogen or a mixture of oxygen and nitrogen as a stripping gas to strip propane or isobutane from said liquid absorbent and obatain a gaseous effluent containing propane or isobutane and stripping gas, and passing said gaseous effluent to said reaction.

3,914,278

PROCESS FOR PREPARING ACRYLONITRILE USING AS CATALYST AN OXIDE COMPOSITION OF ANTIMONY, TIN, TITANIUM AND COPPER OR IRON

Edward James Gasson, Dollar; Stanley Frederic Marrian, Aberdour, and Thomas Charles Krosnar, Polmont, all of Scotland, assignors to BP Chemicals International Limited, London, England

Filed Mar. 12, 1973, Ser. No. 339,998
Claims priority, application United Kingdom, Mar. 17, 1972, 012607/72; Oct. 5, 1972, 045960/72
Int. Cl. C07c *121/02, 121/32*
U.S. Cl. 260—465.3 **16 Claims**

1. A process for preparing acrylonitrile which comprises reacting, in the vapor phase and at an elevated temperature, propylene, molecular oxygen, and ammonia in the presence of an oxide composition catalyst, which is a mixture of oxides of the metal components or of oxygen-containing compounds of the metal components or a mixture of both forms, and in which the metal components consist essentially of antimony, tin, titanium, and copper or iron; the atomic ratio of antimony to tin in said catalyst being from 2:1 to 24:1, the atomic ratio of antimony to titanium being from 1:1 to 24:1, and the amount of copper or iron present being from 0.5% to 30% molar of the total composition.

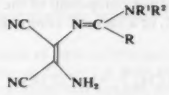
3,914,279

AMINOMETHYLENEAMINOMALEONITRILES

Robert Walter Begland, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Continuation-in-part of Ser. No. 229,556, Feb. 25, 1972, Pat. No. 3,806,517. This application Aug. 8, 1973, Ser. No. 386,746
Int. Cl. C07c *121/42*
U.S. Cl. 260—465.5 R **4 Claims**

1. A compound of the formula



wherein R and R^1 are each alkyl of 1–4 carbons or cycloalkyl of 3–4 carbons, and R^2 is H or an alkyl of 1–4 carbon atoms.

3,914,280

PROCESS FOR PRODUCING β-AMINOPROPIONITRILE

Kiyoshi Yamakami, Tokyo; Osamu Akazawa, Minamifunabori; Yoshiyuki Shibata, Minamifunabori, and Nichio Fujimoto, Minamifunabori, all of Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan

Filed May 31, 1974, Ser. No. 475,027
Claims priority, application Japan, July 30, 1973, 48-85605
Int. Cl.² C07C *120/00*
U.S. Cl. 260—465.5 R **5 Claims**

1. A method for producing β-aminopropionitrile which comprises
a. reacting aqueous ammonia and imino bis-β, β′ propionitrile at a mole ratio of 3 : 1 to 30 : 1 and at a temperature of 130° – 170° C for 10 to 150 minutes to form an equilibrium mixture of said imino bis-β, β′-propionitrile and ammonia with β-aminopropionitrile;
b. adding acrylonitrile to the equilibrium mixture of step (a) wherein the mole ratio of ammonia to acrylonitrile is from 3 : 1 to 5:1, the time of reaction of said acrylonitrile with said equilibrium mixture is from 30 seconds to 10 minutes, and the reaction temperature is from 100 – 150°C;
c. separating ammonia, β-aminopropionitrile and a residue containing imino bis -β, β′-propionitrile;
d. introducing said imino bis-β, β′-propionitrile from step (c) into step (a).

3,914,281

PROCESS FOR THE PRODUCTION OF SUCCINYLOSUCCINIC DIESTER

Erich Greth, Visp, Switzerland, assignor to Lonza, Ltd., Gampel, Valais, Switzerland

Filed Apr. 3, 1973, Ser. No. 347,374
Claims priority, application Switzerland, Apr. 11, 1972, 005280/72The portion of the term of this patent subsequent to Nov. 27, 1990, has been disclaimed.
Int. Cl.² C07C *69/74*
U.S. Cl. 260—468 K **28 Claims**

1. A process for the production of succinylosuccinic acid diester which comprises reacting a γ-haloacetoacetic ester selected from the group consisting of γ-bromoacetoacetic ester and γ-chloroacetoacetic ester, with a strong or medium base at a pH between 8 and 11 in a solvent system consisting essentially of a major amount of at least one or a mixture of dipolar aprotic solvents, each said dipolar aprotic solvent or solvents having a dielectric constant between 20 and 50, measured at 20°C., and maintaining said pH between 8 and 11 during said reaction by continuous or intermittent addition of further amounts of said strong or medium base.

3,914,282
PROSTAGLANDIN E_1, F_1, AND A_1 ANALOGS

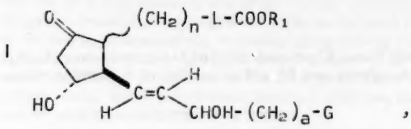
John E. Pike, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 324,026, Jan. 16, 1973, Pat. No. 3,847,966, which is a continuation-in-part of Ser. No. 168,455, Aug. 2, 1971, abandoned, which is a division of Ser. No. 748,158, July 29, 1968, abandoned. This application Apr. 8, 1974, Ser. No. 458,930

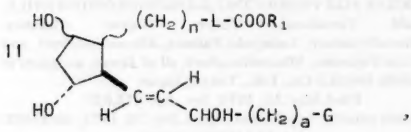
Int. Cl.[2] C07C *61/36, 69/74*

U.S. Cl. 260—468 D 9 Claims

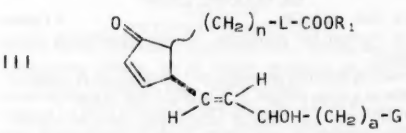
1. An optically active compound of the absolute configuration of natural PGE_1 or a racemic compound with the formula:



I ,



II , or



III

wherein *n* is 1 to 6 and *a* is zero to 4; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein G is 3,3-difluorobutyl,4,4-difluorobutyl, 4,4,4-trifluorobutyl, 3,3,4,4-tetrafluorobutyl, or 3,3,4,4,4-pentafluorobutyl; wherein L is ethylene substituted by one or 2 methyl or ethyl; and wherein ~ indicates attachment of the group to the ring in alpha or beta configuration, and pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,914,283
POLYMERIC LOCAL ANESTHETIC AND ANTI-ARRHYTHMIC AGENTS

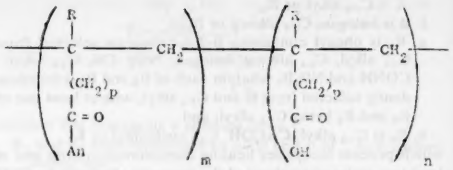
Yoshiyuki Okamoto; Walter Franklin Riker, Jr., both of Fort Lee, and Sidney Udenfriend, North Caldwell, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Dec. 10, 1973, Ser. No. 423,644

Int. Cl.[2] C07C *101/56*

U.S. Cl. 260—472 23 Claims

1. A compound of the formula



wherein An is a radical formed by removal of a hydrogen atom from a free primary or secondary aromatic amino group of a known local anesthetic molecule or an aromatic amino derivative of a known local anesthetic molecule;

An is a covalent amide linkage involving said aromatic amino group of the An moiety; *m* is an integer of from 1 to 1,000; *n* is an integer of from 0 to 1,000 with the proviso that the sum of *m* and *n* is 2 or greater; R is hydrogen or lower alkyl; *p* is an integer of from 0 to 5; with the understanding that the repeating units designated within the separate parentheses are arranged in random fashion; and the salts thereof with pharmaceutically acceptable acids and bases.

3,914,284
SUBSTITUTED UREIDOPHENYL THIOUREAS

Arno Widdig, Blecher; Engelbert Kuhle, Bergisch Gladbach; Klaus Sasse, Schildgen; Hans Scheinpflug, Leverkusen; Ferdinand Grewe, Burscheid; Helmut Kaspers, and Paul-Ernst Frohberger, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

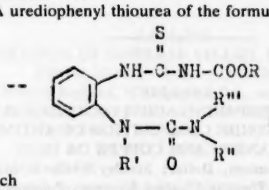
Division of Ser. No. 89,500, Nov. 13, 1970, Pat. No. 3,780,089. This application Sept. 21, 1973, Ser. No. 399,654

Claims priority, application Germany, Nov. 29, 1969, 1960029

Int. Cl.[2] C07C *157/09*

U.S. Cl. 260—470 5 Claims

1. A urediophenyl thiourea of the formula:



in which

R stands for alkyl with 1–12 carbon atoms,

R′ and R″ each stands independently for a hydrogen atom or alkyl with 1–4 carbon atoms, and

R‴ stands for benzyl, phenyl, p-tolyl or p-methoxyphenyl.

3,914,285
(ALKYNYLOXY)ALKYL AND (ALKENYLOXY)ALKYL CARBAMATES

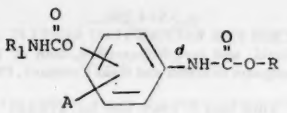
Barrington Cross, Rocky Hill, and Charles Paul Grasso, Cranbury, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 24, 1973, Ser. No. 363,783

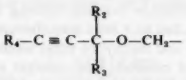
Int. Cl.[2] C07C *125/06*

U.S. Cl. 260—471 C 7 Claims

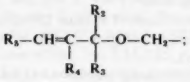
1. A compound of the formula:



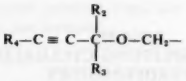
wherein R is alkyl C_1—C_6, alkenyl C_2—C_6, alkynyl C_2—C_6 cycloalkyl C_3—C_7, phenyl, benzyl,



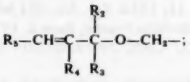
or



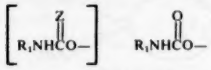
A is hydrogen, alkyl C_1—C_4, chlorine or bromine; R_1 is



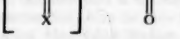
or



R_2 and R_3 are hydrogen or alkyl C_1—C_4; R_4 and R_5 are hydrogen, chlorine or alkyl C_1—C_4; with the proviso that A and



are meta- and para- to the



group, respectively, or para- and meta-, respectively.

3,914,286

LOWER ALKYL ESTERS OF P-BENZOYLPHENOXY ISOBUTYRIC ACID

Andre Mieville, Lausanne, Switzerland, assignor to Orchimed S.A., Switzerland

Filed Feb. 2, 1970, Ser. No. 8,071

Claims priority, application Switzerland, Jan. 31, 1969, 1517/69; Aug. 28, 1969, 13022/69

Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 G **2 Claims**

1. A phenoxy compound which is a methyl, ethyl or propyl ester of p-benzoylphenoxy-isobutyric acid.

3,914,287

METHOD FOR THE RECOVERY OF DIMETHYL TEREPHTHALATE AND INTERMEDIATE PRODUCTS THEREOF

Shinichi Takeda; Tomio Harada; Koshi Namie, all of Matsuyama, and Kotaro Hara, Musashino, all of Japan, assignors to Teijin Hercules Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1973, Ser. No. 337,715

Claims priority, application Japan, Jan. 18, 1973, 48-7339

Int. Cl.² C07C *69/82*

U.S. Cl. 260—475 R **11 Claims**

1. A process for increased production of dimethyl terephthalate and the intermediate products thereof which comprises:

I. oxidizing a mixture of para-xylene and methyl paratoluate in a weight ratio of 2:1 to 1:4 with molecular oxygen or a gas containing molecular oxygen in the liquid phase at a temperature within the range of 140° to 240°C. and in the presence of a catalyst consisting essentially of

A. a first component which is manganese metal, a manganese compound soluble in the reaction system, or a mixture thereof, and

B. a second component which is cobalt metal, a cobalt compound soluble in the reaction system, or a mixture thereof,

the gram-atomic ratio of manganese metal to cobalt metal being 0.1:99.9 to 99:1 when the components are calculated as manganese metal and cobalt metal respectively, the concentration of the catalyst being adjusted so that when the components are calculated as metal their total weight is 50 to 1,500 ppm by weight based on the total weight of the reaction system; then

II. esterifying the reaction product with methanol; then

III). distilling the esterified reaction product to remove dimethyl terephthalate and other compounds having boiling points lower than dimethyl terephthalate and leave a residue comprising reaction products having a boiling point higher than that of dimethyl terephthalate; then

IV. heating the residue to a temperature of from 260° to 400°C. for a time of at least 20/(T-250) hours, wherein T is the temperature in degrees centigrade, thus producing additional dimethyl terephthalate and intermediate products; and

V. distilling the heated residue to remove the additional dimethyl terephthalate and intermediate products formed by the heating, to leave a second residue.

3,914,288

REACTION PRODUCTS OF POLYEPOXIDES, MERCAPTOALKANOIC ACID ESTERS AND AMINES

Edward William Garnish, Saffron Walden, and Clifford George Haskins, Haslingfield, both of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Division of Ser. No. 889,311, Dec. 30, 1969, Pat. No. 3,732,309. This application Mar. 15, 1972, Ser. No. 234,999

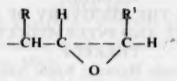
Claims priority, application United Kingdom, Jan. 2, 1969, 402/69

Int. Cl.² C07C *149/22*, *149/20*

U.S. Cl. 260—481 R **14 Claims**

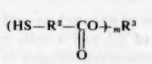
1. Adducts obtained by reaction of

a. a polyepoxide having, per average molecule, more than one 1,2-epoxide group of the formula



directly attached to oxygen, where R and R^1 each represent hydrogen or together represent $—CH_2CH_2—$, said polyepoxide selected from the group consisting of polyglycidyl ethers of polyhydridic phenols, pplyglycidyl ethers of polyhydric alcohols, and polyglycidyl esters of cycloaliphatic polycarboxylic acids;

b. a thioalkanoic acid ester of the formula

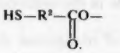


wherein

R^2 is $—CH_2—$ or $—CH_2CH_2—$,

m is an integar of value 2 to 6,

R^3 is residue, after removal of m-alcohol hydroxy groups of a polyoxyalkylene polyol, the positions of at least two of the



groups attached to the residue R^3 being such that the indicated HS-groups are separated from each other by a linear chain of at least 6 carbon or carbon and oxygen atoms; and

c. an alkyl amine,

said adduct is prepared at a temperature of from 35° to 125°C, and wherein sufficient of the polymercaptan (*b*) is used to provide at least 1.3-SH equivalents per 1,2-epoxide group of the polyepoxide (*a*) and the amine (*c*) provides from 0.01 to 0.25 active hydrogen equivalent per 1,2-epoxide groups of (*a*).

3,914,289

PROCESS FOR PREPARING 2-ACETYL-5-METHYL-4-HEXENIC ACID ESTERS

Susumu Akutagawa, Tokyo; Hidenori Kumobayashi, Kanagawa, and Akira Komatsu, Tokyo, all of Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

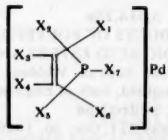
Filed Oct. 4, 1973, Ser. No. 403,361

Claims priority, application Japan, Oct. 5, 1972, 47-100180

Int. Cl.² G07C *67/30*

U.S. Cl. 260—483 **11 Claims**

1. A process for preparing 2-acetyl-5-methyl-4-hexenic acid esters, which comprises reacting isoprene with an acetoacetic acid ester in the presence of a zero-valent palladium-phosphorene complex having the formula



wherein each of X_1, X_2, X_3, X_4, X_5 and X_6 is a hydrogen atom or an alkyl group, an alkenyl group, or a phenyl group, X_7 is an alkyl group, an alkenyl group, a phenyl or para-tolyl group, an alkoxy group, a phenoxy group or an amino group selected from the group consisting of dimethylamino, diethylamino and diphenylamino, with the four phosphorene moieties in the above formula being the same or different, at a temperature of 30° to 150°C in an inert gas atmosphere.

3,914,290

PROCESS FOR ESTERIFYING ACRYLIC ACID

Susumu Otsuki, and Isao Miyanohara, both of Yamaguchi, Japan, assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed May 7, 1969, Ser. No. 822,461

Claims priority, application Japan, Feb. 6, 1969, 44-8444

Int. Cl.² C07C *09/54*

U.S. Cl. 260—486 R **8 Claims**

1. In a process for producing an ester from acrylic acid and an aliphatic alcohol in the presence of a catalyst comprising sulfuric acid in a distillation column serving as a reactor, wherein acrylic acid is fed to a feed tray therein in an upper section of said column and methyl or ethyl alcohol is fed into a lower section of said column, said catalyst is fed into an upper section of said column, wherein continuous reaction and distillation are performed simultaneously in said column, and wherein said ester is distilled from said column, the improvement which comprises

maintaining a concentration of at least 20 percent of acrylic acid in the combined weights of the acrylic acid and sulfuric acid so fed,

so feeding acrylic acid having a concentration of more than 60 percent, and

maintaining a reflux ratio of up to 1 in said column.

3,914,291

PROCESS FOR SPLITTING CYCLOALIPHATIC HYDROPEROXIDES

Lucien Billet, Lyon, and Michel Jouffret, Francheville-La-Bas, both of France, assignors to Rhone-Poulenc Industries, Paris, France

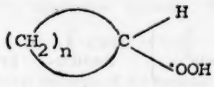
Filed May 31, 1974, Ser. No. 474,965

Claims priority, application France, June 4, 1973, 73.20226

Int. Cl.² C07C *29/14*, *67/00*

U.S. Cl. 260—487 **8 Claims**

1. Process for ring fission of a cycloalkyl hydroperoxide of the general formula:



in which *n* represents an integer from 5 to 11, which comprises reacting in the liquid phase at a temperature from 0°C. to 110°C. the hydroperoxide with an acid reactant selected from trifluoroacetic acid and maleic anhydride to produce the corresponding ω-acyloxyalkanal.

3,914,292

PROCESS FOR PREPARING ACYLOXY-ALKANALS FROM CYCLOALKYL HYDROPEROXIDE AND FORMIC ACID

Jean Claude Brunie, Francheville-le-Haut; Michel Costantini; Noel Crenne, both of Lyon, and Michel Jouffret, Francheville-le-Bas, all of France, assignors to Rhone-Poulenc, S.A., Paris, France

Filed May 31, 1974, Ser. No. 475,028

Claims priority, application France, June 4, 1973, 73.20227

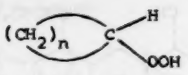
Int. Cl.² C07C *67/00*

U.S. Cl. 260—488 F **7 Claims**

1. In a process for the preparation of an ω-formyloxy-alkanal of the general formula:

$$HC(O)O(CH_2)_nCHO$$

in which *n* represents an integer from 5 to 11, which comprises reacting formic acid with a cycloalkyl hydroperoxide of the formula:



in which *n* is as defined above, the improvement wherein the reaction is carried out in the presence of an anhydrous aprotic polar solvent selected from a polymethylene-sulphone possessing 3 to 6 methylene groups wherein one or more of said methylene groups may be substituted by an alkyl radical with 1 to 4 carbon atoms, or an alkylene glycol carbonate, the alkylene portion containing 2 to 4 carbon atoms.

3,914,293
NAPHTHYL ACETALDEHYDE DERIVATIVES; METHODS OF USE THEREOF; AND PROCESSES FOR THE PREPARATION THEREOF

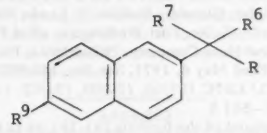
John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Panama, Panama

Division of Ser. No. 250,733, May 5, 1972, Pat. No. 3,852,363, which is a division of Ser. No. 814,855, April 9, 1969, Pat. No. 3,663,713, which is a continuation-in-part of Ser. No. 741,900, July 2, 1968, Pat. No. 3,626,012. This application July 29, 1974, Ser. No. 492,381

Int. Cl.[2] C07C *143/42*

U.S. Cl. 260—512 C **8 Claims**

1. A compound selected from the group of compounds represented by the formula:



wherein R is —CH(OH) (SO_3Y); and Y is sodium or potassium;

one of R^6 and R^7 is hydrogen, the other is hydrogen, methyl, ethyl or difluoromethyl;

and R^9 is lower alkoxy.

3,914,294
3,5-DISUBSTITUTED-2,4,6-TRIIODOBENZOIC ACIDS

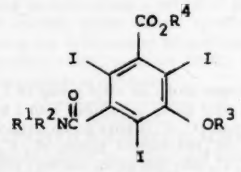
Jack Bernstein, New Brunswick, and Francis Alexander Sowinski, Edison, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed June 1, 1972, Ser. No. 258,557

Int. Cl. C07c *101/72*

U.S. Cl. 260—519 **3 Claims**

1. A compound of the formula:



wherein R^1 to R^3 are selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, 2-hydroxyalkyl of 2 to 6 carbon atoms and 2,3-dihydroxyalkyl of 3 to 6 carbon atoms and R^4 is selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon atoms, 2-hydroxyalkyl of 2 to 6 carbon atoms, 2,3-dihydroxyalkyl of 3 to 6 carbon atoms and when R^4 is hydrogen the pharmaceutically acceptable salts thereof.

3,914,295
CATALYTIC OXIDATION OF HYDROCARBONS WITH ORGANIC HYDROPEROXIDES

Rudolph Rosenthal, Broomall, and Giovanni A. Bonetti, Wynnewood, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 18, 1972, Ser. No. 316,185

Int. Cl.[2] C07C *51/33*

U.S. Cl. 260—524 M **2 Claims**

1. A method for the catalytic oxidation of methyl substituted aromatic hydrocarbons which consists essentially of contacting said hydrocarbon selected from the group consisting of toluene, para-xylene, 1-methyl naphthalene and 2-methyl naphthalene at a temperature in the range of from 80°C. to 105°C. with an organic hydroperoxide selected from tertiary butyl hydroperoxide, cumene hydroperoxide and tertiary amyl hydroperoxide and in the presence of a catalyst selected from cuprous chloride, cobalt naphthenate, chromium naphthenate and vanadium naphthenate to produce a mixture of carboxylic acid and unsymmetrical hydrocarbon peroxide, separating the carboxylic acid and unsymmetrical hydrocarbon peroxide into the acid and peroxide components and catalytically hydrogenating the peroxide with a metal hydrogenation catalyst selected from the group consisting of nickel, platinum and palladium hydrogenation catalyst under hydrogen pressures in the range of 5 to 5000 psig and at a temperature in the range of from 25°C. to 200°C. to produce the alcohol corresponding to the hydrocarbon oxidized and the alcohol corresponding to the hydroperoxide employed.

3,914,296
LIQUID PHASE OXIDATION OF ALCOHOLS TO FORM CARBOXYLIC ACIDS THEREFROM

Charles C. Hobbs, Nueces, Tex., and Hendrik A. van't Hof, Brielle, Netherlands, assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 4, 1974, Ser. No. 430,836

Int. Cl.[2] C07C *51/26*

U.S. Cl. 260—530 R **4 Claims**

1. A process for the production of lower aliphatic monocarboxylic acids, which process comprises

a. forming a liquid reaction mixture comprising about 10 to 85% of at least one alcohol represented by the formula R_1—OH, wherein R_1 is an alkyl or cycloalkyl group of from 1 to 6 carbon atoms, about 10 to 75% of at least one ketone represented by the structural formula

wherein R_2 and R_3 are alkyl groups of from 1 to 6 carbon atoms, and R_4 represents a cycloalkylidene group of from 4 to 20 carbon atoms,

about 5 to 25% of at least one lower aldehyde represented by the structural formula

wherein R_5 is an alkyl or cycloalkyl group of from 1 to 7 carbon atoms,

b. oxidizing the liquid reaction mixture in admixture with a lower aliphatic carboxylic acid reaction solvent at a temperature of about 50° to 200°C and a pressure of about 50 to 1,000 psi with a gas comprising molecular oxygen and with a catalyst which is a carboxylate salt, soluble in said admixture, of at least one metal selected from Groups 1*b*, 5*b*, 6*b*, 7*b*, 8*b*, and the Lanthanide series of the Periodic Table to form an oxygenated reaction product mixture and,

c. recovering from the reaction mixture at least one lower aliphatic carboxylic acid reaction product represented by

the structural formula

wherein R is a hydrogen or an alkyl or cycloalkyl group of from 1 to 6 carbon atoms.

3,914,297

CARBOXY METHYLOXY SUCCINATES

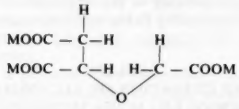
Vincent Lamberti, Upper Saddle River; Mark D. Konort, Haworth, both of N.J., and Ira Weil, New York, N.Y., assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 145,961, May 21, 1971, abandoned, which is a continuation-in-part of Ser. No. 80,166, Oct. 2, 1970, Pat. No. 3,692,685, which is a continuation-in-part of Ser. No. 879,627, Nov. 24, 1969, Pat. No. 3,635,830, which is a continuation-in-part of Ser. No. 731,700, May 24, 1968, abandoned. This application July 22, 1974, Ser. No. 490,618

Int. Cl.² C07C *59/23*

U.S. Cl. 260—535 P **11 Claims**

1. Carboxymethyloxysuccinic acid and the salts thereof having the formula:



wherein M is selected from the group consisting of hydrogen, alkali metal, ammonium, morpholinium, alkylammonium, mono-, di-, or trialkanolammonium cations.

3,914,298

BIPHENYLYLOXYBENZOYL HALIDES

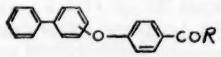
Klaus J. Dahl, Palo Alto, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Division of Ser. No. 218,466, Feb. 16, 1971, abandoned. This application June 4, 1973, Ser. No. 366,326

Int. Cl.² C07C *63/33*

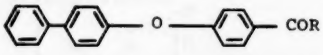
U.S. Cl. 260—544 M **4 Claims**

1. A compound of structure



wherein R is halogen.

2. A compound of structure



wherein R is halogen.

3,914,299

TETRACYCLINES

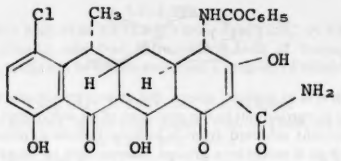
Hans H. Muxfeldt, Ithaca, N.Y., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 832,681, June 12, 1969, abandoned. This application Feb. 2, 1973, Ser. No. 329,140

Int. Cl.² C07C *103/19*

U.S. Cl. 260—559 AT **2 Claims**

1. The compound



3,914,300

PHENYL KETOXIME DERIVATIVES

Ernest Haddock, Sheppey, and William J. Hopwood, Sittingbourne, both of England, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 23, 1971, Ser. No. 211,786

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07C *127/17*

U.S. Cl. 260—553 A **2 Claims**

1. 3′-(N′-methylureido) acetophenone oxime.

2. 3′-(N′,N′-dimethylureido) acetophenone O-methyloxime.

3,914,301

ACRYLAMIDE DERIVATIVES OF 3-ISOTHIAZOLONES

George A. Miller, Glenside; Sheldon N. Lewis, Willow Grove, and Ernest D. Weiler, Fort Washington, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

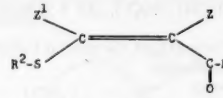
Filed May 6, 1971, Ser. No. 140,992

Int. Cl.² C07C *103/60, 154/00, 154/02, 155/00*

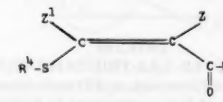
U.S. Cl. 260—561 S **8 Claims**

1. A compound of the formula (a), (b), or (c):

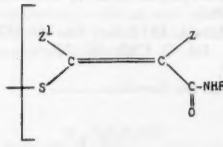
(a)



(b)



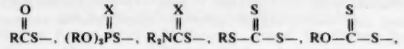
(c)



wherein

R^1 is a hydrogen atom; an alkyl group of 1 to 18 carbon atoms; an alkyl group substituted with a hydroxy group, halogen atom, (C_1–C_4)alkoxy group, cyano group, amino group, (C_1–C_4)alkylamino group, (C_1–C_4)dialkylamino group, (C_1–C_4)alkylthio group, carboxy group, or (C_1–C_4-)carbalkoxy group and having 1 to 18 carbon atoms; an alkenyl or alkynyl group having 2 to 18 carbon atoms; an aryl or aralkyl group of up to 10 carbon atoms; or an aryl or aralkyl group substituted with a hydroxy group, halogen atom, (C_1–C_4)alkoxy group, (C_1–C_4)alkyl group, nitro group, cyano group, amino group, (C_1–C_4)alkylamino group, (C_1–C_4)dialkylamino group, or (C_1–C_4)alkylthio group, carboxy group, or (C_1–C_4)-carbalkoxy group;

R^2 is a group of the formula



wherein

R is a (C_1–C_4)alkyl group and

X is oxygen or sulfur,

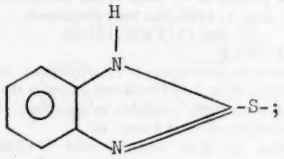
a group of the formula R^3-Q-S,

wherein

Q is a divalent (C_1–C_4) alkylene radical and

R^3 is a group of the formula RO_2C—, HO_2—C—, H_2NOC—, or R_2NOC—, wherein R is as defined above,

or a group of the formula



Z is a hydrogen atom, a halogen atom, or a (C_1–C_4)alkyl group,

Z^1 is a hydrogen atom, a halogen atom, or a (C_1–C_4)alkyl group;

R^5 is an alkyl group of 4 to 18 carbon atoms; and

R^4 is an alkylthio group of 1 to 18 carbon atoms, an arylthio group of 6 to 12 carbon atoms, or an aralkylthio group of 7 to 15 carbon atoms.

3,914,302

PROCESS FOR THE PRODUCTION OF N,N-DIALLYLDICHLOROACETAMIDE

Jimmy Hua-Hin Chan; Jules Kalbfeld, both of Pinole; John Albert Kostecki, San Rafael; Harold Mahonrai Pitt, Lafayette, and Donald Lawrence Seitas, Mill Valley, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Jan. 31, 1974, Ser. No. 438,304

Int. Cl.² C07C *103/02, 103/34*

U.S. Cl. 260—561 HL **23 Claims**

1. In a process for the production of N,N-diallyldichloroacetamide comprising forming a mixture of diallylamine and a suitable inert solvent such as ethylene dichloride, cooling said mixture to −10°C and then slowly adding dichloroacetyl chloride to said mixture under agitation to form a reaction mixture and to effect reaction of the dichloroacetyl chloride with the diallylamine, the improvement comprising forming a mixture of excess diallylamine and from about 5 to about 80 percent aqueous NaOH in the absence of said inert solvent such that at all times during the reaction the pH of the reaction mixture remains above a pH of 10 and adding the dichloroacetyl chloride under violent agitation conditions, while maintaining the temperature of said reaction mixture between from about −10°C to about 100°C, whereby N,N-diallyldichloroacetamide is produced.

3,914,303

PREPARATION OF N,N-DIALKYLACRYLAMIDES

Francis A. Daniher, Alma City, Mich., and Kenneth E. Visek, Stickney, Ill., assignors to CPC International Inc., Englewood Cliffs, N.J.

Filed Sept. 1, 1972, Ser. No. 285,796

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07C *103/30*

U.S. Cl. 260—561 N **22 Claims**

1. A process for the production of an N,N-dialkylacrylamide, comprising:

a. amidating a beta-lower alkoxy substituted propionic acid ester with an amine having one labile hydrogen atom and substituted with two lower alkyl radicals having up to 6 carbon atoms, said amidation reaction being conducted by contacting said ester with said amine at temperatures ranging from about 75°C to about 100°C in the presence of a catalyst-solvent comprising a polyol having at least two vicinal hydroxy groups to form an alcohol and a beta-lower alkoxy substituted N,N-dialkypropionamide,

b. catalytically cracking the beta-lower alkoxy substituted N,N-dialkylpropionamide by contacting the amide in the vapor phase at temperatures ranging from about 300°C to about 500°C with a particulate, acidic cracking catalyst, said catalyst being characterized as containing at least about 50%, by weight SiO_2 and a small but effective amount of Al_2O_3, to thereby form a mixture of an alcohol and the N,N-dialkylacrylamide, and recovering the latter.

3,914,304

PROCESS FOR PREPARING SECONDARY N-VINYL CARBOXYLIC ACID AMIDES

Horst Schnabel, Steinbach, and Michael Mitzlaff, Bad Homburg, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 18, 1974, Ser. No. 489,534

Claims priority, application Germany, July 20, 1973, 2336977

Int. Cl.² C07C *103/34*

U.S. Cl. 260—561 R **3 Claims**

1. Process for preparing secondary N-vinyl carboxylic acid amides having the formula (I)

$$R^1CO-NH-CH=CH_2 \qquad (I)$$

wherein R^1 represents a hydrogen atom or a lower alkyl group, which comprises heating N-α-alkoxyethyl carboxylic acid amides having the formula (II)

$$R^1CONH-\underset{\displaystyle OR^2}{\underset{|}{CH}}-CH_3 \qquad (II)$$

wherein R^1 has the above signification and R^2 represents an alkyl radical, in a gaseous state to temperatures in the range of from 300° to 600°C approximately, condensing the gas mixture formed in this process while rapidly cooling and isolating the N-vinyl carboxylic acid amide of the formula (I) from the condensate in known manner.

3,914,305

N-[(10,11-DIHYDRO-5H-DIBENZO[A,D]CYCLOHEPTEN--YL)METHYL]AMIDES

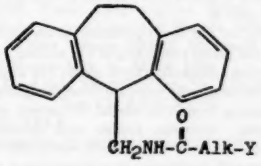
Francois T. Bruderlein, Montreal, and Leslie G. Humber, Dollard Des Ormeaux, both of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 10,306, Feb. 10, 1970, Pat. No. 3,657,250. This application Dec. 21, 1970, Ser. No. 97,481

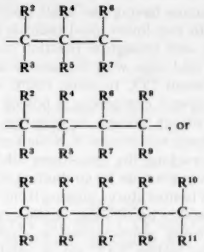
Int. Cl.² C07C *103/34*

U.S. Cl. 260—562 B **5 Claims**

1. A compound of the formula



wherein Alk represents



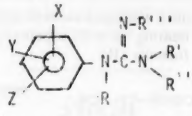
in which R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, R^{10} and R^{11} are the same or different selected from the group consisting of hydrogen and lower alkyl containing from one to six carbon atoms in a straight chain and from one to four carbon atoms in a branched chain, and Y is selected from the group which consists of hydroxyl, chlorine, bromine and iodine.

3,914,306
GUANIDINES

George H. Douglas, Paoli, and Julius Diamond, Lafayette Hill, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

Continuation-in-part of Ser. No. 291,474, Sept. 22, 1972, abandoned. This application July 13, 1973, Ser. No. 379,085
Int. Cl.² C07C *130/12, 103/20, 129/08*
U.S. Cl. 260—562 R **8 Claims**

1. A compound of the formula



where:

X is hydrogen or halo;

Y is hydrogen, halo, haloloweralkyl, nitro, loweralkyl or loweralkoxy;

Z is halologeralkyl, haloloweralkoxy or loweralkylsulfonyl; Z is also halo, loweralkoxy, loweralkyl, nitro or cyano provided X and Y are not both hydrogen at the same time;

R is hydrogen or lower alkyl; R′ and R‴ are hydrogen, acetyl or propionyl; and R″ is acetyl or propionyl or a salt thereof of a pharmaceutically acceptable acid.

3,914,307
HYDROGENATION OF AROMATIC AMINES

Stephen N. Massie, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 27, 1973, Ser. No. 428,996
Int. Cl.² C07C *85/24, 87/14, 87/36, 87/38*
U.S. Cl. 260—563 B **10 Claims**

1. A process for the hydrogenation of an aromatic amine selected from the group consisting of (1) aniline, (2) nuclearly substituted anilines possessing from about 1 to about 3 nuclear substituents independently selected from the group consisting of alkyl possessing from 1 to about 10 carbon atoms, lower alkoxy, chlorine, bromine, iodine and amino and (3) di(aminophenyl) lower alkanes, which comprises treating said aromatic amine with hydrogen, at a temperature of about 50° C. to about 250° C. and a pressure of from about 1 atmosphere to about 200 atmospheres, in the presence of a catalyst consisting essentially of a supported Group VIII metal and a polyheterocyclic amine selected from the group consisting of 1,4-diazabicyclo[2.2.2]octane and 1-azabicyclo[2.2.2]-octane, and recovering the resultant hydrogenated aromatic amine.

3,914,308
SOLUBILIZING PROCESS

Frederic C. McCoy, Beacon, N.Y., and Carl Loyal W. Swanson, deceased, late of Hopewell Junction, N.Y. (by Viola C. Swanson, executrix), assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 878,586, Nov. 20, 1969, Pat. No. 3,681,348. This application July 27, 1972, Ser. No. 275,680. The portion of the term of this patent subsequent to Aug. 1, 1989, has been disclaimed.
Int. Cl.² C07C *123/00*
U.S. Cl. 260—564 F **7 Claims**

1. A process for converting N-(2-alkylidene) aminoguanidines containing from 7 to 15 carbon atoms in the alkyl moiety, which are normally insoluble in paraffinic oils to their oil-soluble complexes, by the steps of:

a. admixing at least one of said N-(2-alkylidene) aminoguanidines to be solubilized, at temperatures ranging from about 20°C on up to about 100°C,

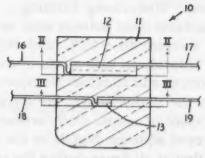
b. with a molar excess of at least one alkylated phenol whose alkyl groups contain 3 to 30 carbon atoms, to form an admixture, and

c. continuing said admixing until a substantially clear solution of oil-soluble complex is obtained.

3,914,309
SENSING DEVICE

Eugene T. Swensen, 2400 W. 102nd St., Apt. 313, Minneapolis, Minn. 55431

Filed Dec. 26, 1973, Ser. No. 428,072
Int. Cl.² G01D *21/04;* **G06K** *7/10;* **G06M** *7/00*
U.S. Cl. 250—569 **7 Claims**



1. A device for sensing radiation reflected from a surface, said radiation sensing device comprising:

a micro emitter for emitting a beam of radiation;

a photo transistor for sensing reflected radiation, said photo transistor being disposed within the direct path of said radiation beam; and

a transparent package for containing said micro emitter and said photo transistor;

whereby the beam of radiation may travel past the photo transistor and when striking a reflective surface is returned to the photo transistor where the reflected beam is sensed.

3,914,310
PHENOXY-SUBSTITUTED ORTHO-NITROANILINES AND ORTHO-PHENYLENEDIAMINES

Wilhelm Ernst Frick, Pfeffingen; Anton G. Weiss, Basel; Thomas Wenger, and Walter Traber, both of Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

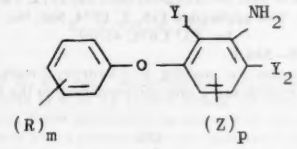
Division of Ser. No. 851,524, June 30, 1969, Pat. No. 3,673,209, which is a division of Ser. No. 570,159, Aug. 4, 1966, Pat. No. 3,506,767. This application May 30, 1972, Ser. No. 257,724

Claims priority, application Switzerland, Aug. 6, 1965, 11111/65; Nov. 11, 1965, 11586/65; Jan. 5, 1966, 103/66

Int. Cl.² C07C *93/14, 149/42*

U.S. Cl. 260—571 **7 Claims**

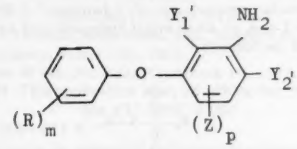
1. A compound of the formula



wherein

one of Y_1 and Y_2 is nitro and the other one is hydrogen or halogen; Z is halogen; R is trifluoromethyl, methoxy, chlorine or bromine; *m* is an integer of from 0 to 5; and *p* is an integer of from 0 to 2.

2. A compound of the formula



wherein

one of Y_1' and Y_2' is amino and the other one is hydrogen or halogen;

Z is or halogen;

R is trifluromethyl, methoxy, chlorine or bromine;

m is an integer of from 0 to 5; and

p is an integer of from 0 to 2.

3,914,311
PREPARATION OF AROMATIC SECONDARY AND TERTIARY AMINES USING A NICKEL COMPLEX CATALYST

Dale Robert Coulson, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed June 15, 1973, Ser. No. 370,285

Int. Cl.² C07C *87/52, 87/54, 87/56, 87/64*

U.S. Cl. 260—577 **14 Claims**

1. The process of preparing an aromatic secondary or aromatic tertiary amine which comprises the step of contacting

a. an aromatic halide of the formula ArX wherein

Ar is an aromatic ring group containing 4–20 carbon atoms and such groups substituted with up to 2 annular O, N or S atoms, each ring having 5 or 6 atoms,

X is chlorine, bromine or iodine; with

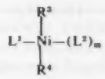
b. an amino compound of the formula R^1R^2NH wherein

R^1 is H or alkyl of 1 to 4 carbon atoms, except that it is not H where X is bromine or iodine;

R^2 is alkyl of 1 to 4 carbon atoms or aryl of 6–10 carbon atoms, with the proviso that R^1 and R^2 together can form a ring structure containing up to 8 carbon atoms and such ring structures containing an alkyl substituent of 1 to 4 carbon atoms;

c. in the presence of a catalytically effective amount of a catalyst complex having a formula selected from the group

I)



wherein

L^1 and L^2, individually, are monodentate organic ligands selected from the group R_3P, $R_2P(OR)$, $RP(OR)_2$, $P(OR)_3$, $R_2P(SR)$, $RP(SR)_2$, $P(SR)_3$, and when taken together are bidentate organic ligands selected from the group $R_2P(CH_2)_nPR_2$ and cyclooctadiene;

m is zero or 1;

R^3 and R^4, individually, are selected from the group R_3P, $R_2P(OR)$, $RP(OR)_2$, $P(OR)_3$, $R_2P(SR)$, $RP(SR)_2$, $P(SR)_3$, Cl^- and Br^-; and when taken together are selected from the group $R_2P(CH_2)_nPR_2$, cyclooctadiene and acetylacetonate; each R is aryl of 6–10 carbons or alkyl of 1–4 carbons;

and $n = 1$ to 3; and

(II)

wherein

L^1, L^2, L^3 and L^4 have the values recited above for L^1 and L^2 and additionally may each be CO, with the proviso that at least one L is CO;

at a temperature range of 25°–250°C, using an amine to aromatic halide mole ratio of 2:1 to 10:1, and recovering an aromatic secondary or aromatic tertiary amine.

3,914,312
PROCESS FOR THE PREPARATION OF PROPARGYLAMINE

Albert Rene Joseph Castaigne, Toulouse, France, assignor to Centre d'Etudes pour L'Industrie Pharmaceutique, Toulouse, France

Filed Jan. 18, 1974, Ser. No. 434,593

Claims priority, application France, Feb. 7, 1973, 73.04323

Int. Cl.² C07C *87/06, 87/24*

U.S. Cl. 260—583 H **5 Claims**

1. Process for the preparation of propargylamine, comprising reacting propargylphthalimide with an amine selected from the group consisting of diethylene triamine, triethylene tetramine, diethylaminopropylamine, dipropylenetriamine, ethanolamine, N-aminoethylethanolamine, N-aminoethylpiperazine and benzylamine.

3,914,313
METHOD FOR THE PRODUCTION OF CYCLOPENTAMETHYLENE KETENE

Giancarlo Sioli, Como; Luigi Giuffré, Milan; Franco Righi, Cesano Maderno, and Giancarlo Matera, Milan, all of Italy, assignors to Snia Viscosa Societa' Nazionale Industria Applicazioni Viscosa S. p. A., Milan, Italy

Filed Feb. 25, 1971, Ser. No. 118,951

Int. Cl.² C07C *45/18*

U.S. Cl. 260—585.5 **5 Claims**

1. A method for the production of alicyclic ketenes comprising

heating a compound selected from the group consisting of hexahydrobenzoic acid and hexahydrobenzoic acid anhydride at a temperature between 550° and 750°C and at a

pressure of about 20 Torr. in a vessel made of copper or of a steel which contains no nickel, and

fractionally condensing the gases and vapors obtained to recover cyclopentamethyleneketene.

3,914,314

OXYGENATED DERIVATIVES OF THUJOPSENE

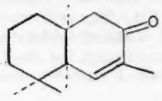
Gary W. Shaffer; Garry C. Kitchens, both of Wayne, and Kent Kaiser, Pequannock, all of N.J., assignors to Givaudan Corporation, Clifton, N.J.

Filed June 25, 1970, Ser. No. 49,950

Int. Cl.² C07C *45/04, 49/44*

U.S. Cl. 260—586 P **4 Claims**

1. A compound of the stucture



2. A process for the preparation of the compound of claim **1,** which comprises oxidizing cis-dihydrothujopsene with an oxidant selected from the group consisting of alkali metal dichromates and alkyl chromates in an anhydrous medium.

3,914,315

METHOD FOR PREPARING 5-CYCLOHEXADECEN-1-ON

Akihisa Miyake; Hisao Kondo, both of Kamakura; Takashi Nishidoi, Otsu, and Osamu Onnagawa, Kamakura, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Sept. 20, 1973, Ser. No. 399,074

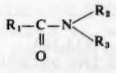
Claims priority, application Japan, Sept. 27, 1972, 47-96227

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 R **8 Claims**

1. A method for preparing 5-cyclohexadecen-1-on which comprises heating 1,2-divinyl cyclododecan-1-ol at a temperature ranging from about 150°C to about 300°C in the presence of a compound selected from the group consisting of:

a. an N-alkyl N-alkyl carboxylic acid amide represented by the formula

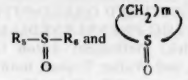


wherein R_1 is H or an alkyl radical having 1 to 6 carbon atoms, and R_2 and R_3 are alkyl radicals having 1 to 6 carbon atoms,

b. an N-alkyl lactam represented by the formula

wherein *n* is an integer from 2 to 11, inclusive, and R_4 is an alkyl group having 1 to 6 carbon atoms, and

c. a sulfoxide selected from the group consisting of



wherein R_5 and R_6 are alkyl radicals having 1 to 4 carbon atoms and m is an integer from 4 to 6 inclusive.

3,914,316

PREPARATION OF 2-(SULFUR-SUBSTITUTED)-3-HYDROXY-5,5-DIMETHYL-2-CYCLOHEXEN-1-ONES

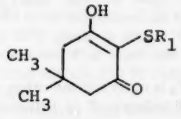
Joseph E. Dunbar, and Thomas J. Bohnert, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 319,361, Dec. 29, 1972, Pat. No. 3,852,359. This application Feb. 1, 1974, Ser. No. 438,929

Int. Cl.² C07C *45/00*

U.S. Cl. 260—586 R **4 Claims**

1. A process for making a 3-hydroxy-2-mercapto-5,5-dimethyl-2-cyclohexen-1-one corresponding to the formula



wherein R_1 represents a 1 to 6 carbon atom alkyl, alkenyl, haloalkenyl, 2-(lower alkylthio)lower alkyl or cyclohexylmethyl group, which comprises heating a mixture of substantially equimolar proportions of 3-hydroxy-5,5-dimethyl-2-cyclohexen-1-one, an alkali metal hydroxide and an R_1-thiolsulfonate of the formula

wherein R_3 is selected from the group consisting of lower alkyl, phenyl, loweralkylphenyl, halophenyl and lower alkoxyphenyl and R_1 is as defined above in the presence of water and a water-miscible organic solvent not reactive therewith under conditions of reaction at a temperature between about 45°C. and reflux to substantial completion of the reaction and recovering the said product.

3,914,317

ANTIFUNGAL COMPOUNDS

William James McGahren, Demarest, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 393,373, Aug. 31, 1973, abandoned. This application June 12, 1974, Ser. No. 478,666

Int. Cl. C07c *49/76*

U.S. Cl. 260—592 **2 Claims**

1. 3-Chloro-1′,2′-dihydro-1′β,2′β,6-trimethyl-1′-propionaphthone.

3,914,318

PROCESS FOR PREPARING 4-METHYLSULFINYLBENZALDEHYDE

Seemon H. Pines, Murray Hill, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Filed May 24, 1973, Ser. No. 363,704

Int. Cl.² C07C *47/52*

U.S. Cl. 260—599 **5 Claims**

1. A process for the preparation of 4-methylsulfinylbenzaldehyde which comprises treating 4-methylthiobenzalde-

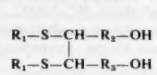
hyde in a solvent consisting of a C_{1-5} alkanoic acid containing up to an equal proportion by volume of a haloalkane with 1–3 molar equivalents of hydrogen peroxide at −15°C. to 30°C. for 2–15 hours.

3,914,319
BISTHIOALKYL GLYCOLS

Robert Ernest Arthur Dear, Mount Kisco, and Eduard Karl Kleiner, New York, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 4, 1974, Ser. No. 439,498
Int. Cl.² C07C *149/18*
U.S. Cl. 260—609 R **13 Claims**

1. A compound of the formula



wherein

R_2 and R_3 are each independently straight or branched alkylene of 1 to 12 carbon atoms; alkylene of 1 to 12 carbon atoms substituted by one or two of phenyl, lower alkyl of 1 to 4 carbon atoms or cyclohexyl; or a group of the formula

$$C_mH_{2m}(OC_kH_{2k})_r$$

where

m is an integer from 1 to 12,
k is an integer from 2 to 6, and
r is an integer from 1 to 40.

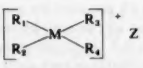
3,914,320
PREPARATION OF ETHERS

Ronnie D. Gordon, Richardson, Tex., assignor to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 233,771, March 10, 1972, Pat. No. 3,824,295. This application Mar. 25, 1974, Ser. No. 454,040
Int. Cl.² C07C *41/00*
U.S. Cl. 260—611 A **14 Claims**

1. A process for preparing symmetrical ethers wherein the process comprises reacting halogenated hydrocarbons containing from 1 to 40 carbon atoms, with an alkali metal hydroxide, in aqueous solution, at a temperature in the range of about 30° to about 50°C, in the presence of a catalytic amount, in the range of from about 0.01 to about 20 weight percent, based on said organic compound, of a quaternary salt and recovering from the reaction mixture by distillation the desired symmetrical ether, said process being characterized further in that:

A. the quaternary salt is represented by the formula:



wherein (1) M is a pentavalent ion of an element selected from the group consisting of nitrogen, phosphorus, arsenic, antimony, and bismuth; (2) R_1, R_2, R_3 and R_4 are alkyl groups containing from 1 to about 30 carbon atoms; and (3) Z is an anion selected from the group consisting of halides, sulfates, alkyl sulfates, sulfonates, and acetates;

B. the halogenated hydrocarbon is selected from the group consisting of:

i. dihaloalkanes represented by the formula $X(CH_2)_nX$ wherein X is a chloride or bromide anion, and *n* is an integer of from 1 to 20;

ii. internally substituted mono-, di- and tri-chlorinated or brominated alkanes containing from 4 to 40 carbon atoms;

iii. unsaturated alkyl chlorides or bromides containing 3 to 40 carbon atoms; and

iv. mono-and di-chlorosubstituted monocyclic aromatic hydrocarbons selected from the group consisting of benzyl chloride and α, α′-dichloroxylene; and

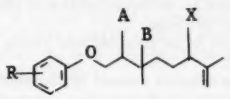
C. the amount of alkali metal hydroxide, based on said halogenated hydrocarbon, on a molar basis, is in the range of about 1:1 to about 5:1.

3,914,321
CERTAIN GERANYL PHENYL ETHERS

Ferenc M. Pallos, Walnut Creek, and Chien K. Tseng, El Cerrito, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 376,787, July 5, 1973, which is a division of Ser. No. 198,018, Nov. 4, 1971, Pat. No. 3,772,365. This application Mar. 11, 1974, Ser. No. 450,031
Int. Cl.² C07C *43/20*
U.S. Cl. 260—612 D **4 Claims**

1. A compound of the formula:



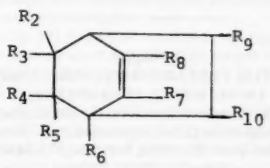
in which R is lower alkyl having 1 to 4 carbon atoms in the 3 or 4 position; X is chlorine or bromine; and A and B together form a bond.

3,914,322
BICYCLIC FRAGRANCE MATERIALS AND PROCESSES THEREFOR

Robert L. Chappell, Moorestown, N.J.; Edward J. Shuster, Brooklyn, N.Y.; Joaquin F. Vinals, Red Bank, and Manfred H. Vock, Locust, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 402,157, Oct. 1, 1973. This application Aug. 2, 1974, Ser. No. 494,034
Int. Cl.² C07C *35/22*
U.S. Cl. 260—617 F **7 Claims**

1. A bicyclo-[2.2.2]-octane derivative having the formula



wherein one of R_2 and R_3 is hydroxy and the other is lower alkyl; R_4 and R_5 are methyl; one of R_9 and R_{10} is hydrogen and the other is hydrogen or lower alkyl; R_1, R_6, R_7 and R_8 are hydrogen or lower alkyl.

3,914,323
PROCESS FOR PREPARING DIPHENOLS

Paolo Maggioni, Como, Italy, assignor to Brichima S.p.A., Milan, Italy

Filed Aug. 1, 1973, Ser. No. 384,416
Claims priority, application Italy, Aug. 18, 1972, 28265/72
Int. Cl.² C07C *37/00*
U.S. Cl. 260—621 G **5 Claims**

1. A process for preparing a mixture of pyrocatechin and hydroquinone by the hydroxylation of phenol with hydrogen peroxide, in which the phenol is reacted with hydrogen peroxide at a molar ratio of phenol:H_2O_2 of between 2:1 and 30:1 in the presence of a catalyst consisting essentially of a cobalt compound selected from the group consisting of the sulphate,

chloride, nitrate, acetate, acetylacetonate wherein said cobalt compound is present in a quantity of less than 1% molar with respect to the phenol, wherein the process is conducted at a pH of less than 5 by addition of a strong mineral acid to the reaction mixture and wherein the reaction is conducted with a phenol concentration in the reaction mixture of between 10 and 90%.

3,914,324

PROCESS FOR THE PREPARATION OF DIPHENOLS

Paolo Maggioni, Como, Italy, assignor to Brichima S.p.A., Milan, Italy

Division of Ser. No. 218,557, Jan. 17, 1972, Pat. No. 3,836,591. This application Apr. 4, 1974, Ser. No. 457,985
Claims priority, application Italy, July 17, 1971, 26963/71
Int. Cl.² C07C *27/00, 37/00*
U.S. Cl. 260—621 G 2 Claims

1. In a process for the preparation of catechol and hydroquinone in admixture by the hydroxylation of phenol
with hydrogen peroxide
in the presence of an alkanoic acid having 1 to 4 carbon atoms and
a catalytically effective amount of phosphoric acid,
the improvement which comprises constantly maintaining the hydrogen peroxide concentration between 5 and 15% by moles with respect to phenol by continuous feeding.

2. A process for the preparation of catechol and hydroquinone in admixture comprising
hydroxylating phenol
with hydrogen peroxide at a constant concentration with respect to phenol
in the presence of an alkanoic acid having 1 to 4 carbon atoms and
a catalyst selected from the group consisting of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, oxalic acid, benzensulfonic acid, and toluensulfonic acid present in an amount between 0.03 and 10% by moles with respect to phenol
at a temperature between 50° and 100°C wherein the concentration of hydrogen peroxide with respect to phenol is constantly kept between 5 and 15% by continuously feeding hydrogen peroxide in the reaction mixture.

3,914,325

METHOD FOR PREPARING PHENOL COMPOUNDS USING MIXED ACID SYSTEM

David F. Gavin, Cheshire, and John H. Tobin, Hamden, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed June 21, 1973, Ser. No. 372,244
Int. Cl.² C07C *39/24*
U.S. Cl. 260—623 R 14 Claims

1. A method for preparing phenol compounds which comprises:

a. diazotizing an aminobenzene compound of the formula:

where R is selected from the group consisting of halogen, trifluoromethyl and alkyl of 1 to 4 carbon atoms
in an aqueous medium in the presence of a nitrosating agent and a mixed phosphoric and sulfuric acid system at a temperature of from about −5° to about 50°C. to form a reaction mixture containing the diazonium salt of the aminobenzene compound, and

b. heating said reaction mixture at a temperature of from about 100° to about 160°C. to decompose said diazonium salt to the corresponding phenol compound.

3,914,326

CATALYZED DECOMPOSITION OF VIC-DIIODOPERHALOALKANES

William J. Cunningham, Williamsville; Richard F. Sweeney, Elma, both of N.Y.; Charles C. Y. Yao, St. Louis, Mo., and Louis G. Anello, Orchard Park, N.Y., assignors to Allied Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 21,777, March 9, 1970, abandoned. This application Nov. 26, 1973, Ser. No. 419,012
Int. Cl.² C07C *21/18*
U.S. Cl. 260—653.5 14 Claims

1. The method which comprises heating a mixture consisting essentially of vic-diiodoperfluoroalkane, an iodide salt selected from the group consisting of alkali metal iodides, NH_4I and tetraalkyl ammonium iodides and an inert polar organic solvent, at substantially atmospheric pressure, at temperatures in the range of about 50°–300°C., and for a period of time sufficient to decompose a substantial quantity of the vic-diiodoperfluoroalkane to the corresponding perfluoroalkene.

3,914,327

CATALYZED HALOGEN EXCHANGE PROCESS

Morris A. Johnson, and Kang Yang, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 163,439, July 16, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 389,905
Int. Cl.² C07C *17/20*
U.S. Cl. 260—658 R 4 Claims

1. A halogen exchange process comprising reacting a bromoalkane with an alkylchloride at temperatures ranging from ambient to 300°C in the liquid phase in the presence of activated charcoal, activated carbon, or mixtures of both, said bromoalkane being a mono- or di-bromo substituted paraffinic hydrocarbon having 2 to 20 carbon atoms provided that no more than one bromine atom is attached to any one carbon atom, and said alkylchloride being defined by RCl wherein R is an alkyl radical having 2 to 20 carbon atoms.

3,914,328

CATALYST REGENERATION

Robert Joseph Blake, Oakland, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 144,403, May 17, 1971, abandoned. This application Oct. 9, 1973, Ser. No. 404,441
Int. Cl.² B01D *15/06*
U.S. Cl. 260—659 A 6 Claims

1. In a catalytic process for the oxychlorination of hydrocarbons having 1 through 4 carbon atoms and chlorinated derivatives thereof characterized by extended catalyst life, wherein the catalyst employed has a composition comprising a mixture of from about 1 to about 15 per cent by weight copper chloride, from about 1 to about 15 per cent by weight alkali metal chloride, and from about 0.5 to 18 per cent by weight rare earth metal chloride, or mixtures of rare earth metal chlorides, deposited on a support having a low surface area comprising, contacting the hydrocarbon and chlorinated derivatives thereof having sulfur containing impurities therein, a chlorinating agent, and an oxygen containing gas in a reactor at a temperature of from about 350°C. to about 550°C., at a pressure of about 1 atmosphere or greater, and in the presence of said catalyst, until the catalyst has become deactivated with at least 2 per cent by weight of sulfur containing compounds where the sulfur is expressed as the sulfate, the improvement comprising raising the temperature employed in the reactor to at least about 585°C. for a time sufficient to activate the catalyst by removal of the sulfur containing compounds, while maintaining the flow of reactants to the reactor, and thereafter lowering the temperature to a temperature of from about 340°C. to about 550°C. and continuing the contacting of the hydrocarbon, chlorinating agent, and oxygenating agent.

3,914,329

OLIGOMERS OF DIISOPROPYLBENZENE

Herbert Naarmann, Wattenheim, and Heinz Pohlemann, Limburgerhof, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed July 25, 1974, Ser. No. 491,625

Claims priority, application Germany, July 13, 1973, 2338709

Int. Cl.² C07C *15/04, 3/02*

U.S. Cl. 260—668 R 6 Claims

1. A process for the manufacture of oligomers of diisopropylbenzene, wherein 100 parts of a mixture obtained from the Friedel Crafts reaction of benzene with propene and containing from 50 to 80 percent of m-diisopropylbenzene and from 10 to 40 percent by weight of p-diisopropylbenzene are reacted with from 5 to 100 parts by weight of an organic peroxide compound at temperatures of from 130° to 230°C and in the presence of from 0.1 to 2 parts by weight of an inorganic reducing agent.

6. Colorless oligomers of diisopropylbenzene having an average degree of polymerization of from 3 to 30 and containing from 55 to 85 percent by weight of m-diisopropylbenzene units and from 15 to 45 percent by weight of p-diisopropylbenzene units.

3,914,330

PROCESS OF AVERAGING SATURATED HYDROCARBONS WITH A CATALYTIC MASS COMPRISING A CATALYTIC COMPONENT FOR ALKANE DEHYDROGENATION AND A CATALYTIC COMPONENT FOR OLEFIN AVERAGING

Thomas R. Hughes, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 864,871, Oct. 8, 1969, abandoned, Continuation of Ser. No. 150,863, June 1, 1971, abandoned. This application Mar. 5, 1973, Ser. No. 337,980

Int. Cl.² C07C *9/00, 3/00*

U.S. Cl. 260—676 R 12 Claims

1. A process for averaging saturated hydrocarbon feed components of different molecular weight to components of intermediate molecular weight relative to the feed components which comprises contacting the saturated hydrocarbon feed components at a temperature between about 400° and below 800°F. in a reaction zone with a catalytic mass comprising a first component which has catalytic activity for alkane dehydrogenation, and a second component which has catalytic activity for olefin averaging, and maintaining the olefin concentration in the reaction zone sufficiently low to produce in the reaction zone a saturated hydrocarbon product containing said components of intermediate molecular weight and containing less than 5 mole percent olefin.

3,914,331

DISPROPORTIONATION OF ALIPHATIC COMPOUNDS

Stanley J. Lucki, Runnemede; Nai Yuen Chen, R.D. Titusville, both of N.J., and Emerson Bowes, Erie, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 101,193, Dec. 23, 1970, abandoned, which is a continuation of Ser. No. 722,207, April 18, 1968, abandoned. This application Apr. 11, 1973, Ser. No. 350,245

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C07C *3/62*

U.S. Cl. 260—676 R 9 Claims

1. A method for effecting catalytic conversion of a paraffin charge under conditions of disproportionation which comprises contacting said paraffin charge at a temperature between 350 and 900°F. and under a pressure between 0 and 3,000 psig. with a catalyst comprising a catalytically-active zeolite which can be represented in terms of mole ratios of oxides in the anhydrous state as follows:

$$0.9 \pm 0.2\ M_{2/n}O : Al_2O_3 : 3\text{–}20\ SiO_2$$

wherein M is a cation selected from the group consisting of hydrogen, ammonium, alkylammonium and arylammonium and *n* is the valence of M, said zeolite having the X-ray diffraction pattern values of Table 1 of the specification.

3,914,332

OXIDATIVE DEHYDROGENATION OF BUTANE

Alan F. Dickason, Chester, Del., assignor to Sun Ventures, Inc., St. Davids, Pa.

Filed Nov. 23, 1973, Ser. No. 418,499

Int. Cl.² C07C *5/48*

U.S. Cl. 260—680 E 8 Claims

1. A process for the oxidative dehydrogenation of butane to form a mixture of butenes and butadiene which comprises contacting said butane with oxygen in the presence of an oxidative dehydrogenation catalyst having a composition of about **9** wt. percent V_2O_5; about **29** wt. percent K_2SO_4; about **12** wt. percent SO_3; and about **50** wt. percent SiO_2, wherein the reaction is carried out at temperatures of from about 450°to **650°C** and at a GHSV of from about **1000** to **20,000** hr^{-1}, and wherein the ratio of oxygen to butane is in the range of from about **1:1** to **20:1.**

3,914,333

POWDER COATING COMPOSITIONS COMPRISING A BLEND OF COREACTIVE POLYMERS - II

Santokh S. Labana, Dearborn Heights, and Ares N. Theodore, Farmington, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 19, 1973, Ser. No. 426,169

Int. Cl.² C08L *63/00*

U.S. Cl. 260—836 3 Claims

1. In a thermosettable powder paint which exclusive of pigments, antistatic agents, and plasticizers, the same being conventional non-reactive additives to a thermosettable powder paint, consists essentially of a coreactable particulate mixture of

1. an epoxy-functional copolymer of monoethylenically unsaturated monomers having a glass transition temperature in the range of 40° to 90°C.,
2. a carboxy-functional compound as crosslinking agent for said copolymer, and
3. 0.05 to 4.0 weight percent of a non-reactive polymeric flow control agent based on the weight of said coreactable particulate mixture,

the improvement wherein

A. said copolymer is a difunctional copolymer of about 5 to about 20 weight percent of a glycidyl ester of a monoethylenically unsaturated carboxylic acid, about 2 to about 10 weight percent of an alpha-beta olefinically unsaturated amide, and about 70 to about 93 weight percent monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a C_1–C_8 monohydric alcohol and acrylic acid, esters of a C_1–C_8 monohydric alcohol and methacrylic acid and C_8–C_{12} monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000, and

B. said carboxy-functional compound is a difunctional copolymer of about 2 to about 20 weight percent of an anhydride of an alpha-beta olefinically unsaturated dicarboxylic acid, about 2 to about 20 weight percent of an alpha-beta olefinically unsaturated monocarboxylic acid and a remainder making a total of 100 weight percent of monoethylenically unsaturated monomers consisting essentially of monofunctional monomers selected from the group consisting of esters of a C_1–C_8 monohydric alcohol and acrylic acid, esters of a C_1–C_8 monohydric alcohol and methacrylic acid and C_8–C_{12} monovinyl hydrocarbons, and has average molecular weight in the range of about 1500 to about 15,000,

said carboxy-functional compound being present in an amount such that the functional group of greatest concentration thereon provides about 0.3 to about 1.2 functional groups per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound and such that the functional group of second greatest concentration on said carboxy-functional compound provides about 0.1 to about 0.4 functional group per functional group on said epoxy-functional copolymer that is reactable with said carboxy-functional compound.

3,914,334
FLEXIBLE ELECTRICAL INSULATING POLYMERIC SHEET

Hyman R. Lubowitz, Hawthorne, and Harry Raech, Jr., Torrance, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed July 31, 1974, Ser. No. 493,294
Int. Cl.[2] C08L *63/00*
U.S. Cl. 260—836 **3 Claims**

1. A flexible electrically insulating polymeric sheet comprising:
   A. 90% to 95% by weight of polybutadiene-epoxy elastomeric resin having an organic peroxide homogeneously dispersed therethrough and having a ratio of
      i. one equivalent of hydroxy terminated polybutadiene homopolymer consisting essentially of at least 50% of 1,2-polybutadienediol,
      ii. one gram mole of an aromatic acid anhydride,
      iii. 1 to 1.2 equivalents of a polyfunctional epoxy resin; and
   B. 10% to 5% by weight of a dicarboxy terminated butadieneacrylonitrile copolymer comprising 16% to 50% by weight acrylonitrile and the balance butadiene and having an average molecular weight between about 3,000 and about 34,000.

3,914,335
CROSS-LINKING COATING COMPOSITION

Hideyoshi Tugukuni, Sakai; Masafumi Kano, Kyoto, and Yoshihisa Chikazoe, Ibaraki, all of Japan, assignors to Dai Nippon Toryo Co., Ltd., Osaka, Japan

Filed Sept. 6, 1973, Ser. No. 394,716
Claims priority, application Japan, Sept. 13, 1972, 47-92135
Int. Cl.[2] C08L *9/00*, *75/04*
U.S. Cl. 260—859 R **15 Claims**

1. A thermosetting coating composition comprising
   A. an organic liquid of no polarity or a low dissolving powder as a dispersion medium, said organic liquid being capable of dissolving monomers but incapable of dissolving polymers formed from the monomers, and dispersed therein
   B. particles of a copolymer formed by copolymerization of (1) a copolymerizable, latent isocyanate containing, unsaturated monomer capable of releasing an isocyanate group under heating and (2) an α,β-ethylenically unsaturated monomer, a homopolymer of which is insoluble in said organic liquid, said copolymer particles having around the periphery thereof a component solvated in said organic liquid and compatible with said copolymer or chemically bonded to said copolymer selected from the group consisting of vinyl polymers having a molecular weight of about 1,000 to 20,000 and synthetic rubbers having a molecular weight of about 5,000 to 50,000 and selected from the group consisting of polyisobutylene, polyisoprene, polychloroprene, isoprene-isobutylene copolymers, polybutadiene, butadiene-styrene copolymers, butadieneacrylonitrile copolymers and butadiene-isobutylene copolymers, wherein at least one of said latent isocyanate-containing monomer, said α,β-ethylenically unsaturated monomer and said component solvated in said organic liquid contains an active hydrogen atom, the solvated component constitutes 5 to 65% by weight of the total dispersed solids, the average size of the dispersed particles is from 0.1 to 10μ, the ratio of latent isocyanate group/active hydrogen group is from 0.3 to 2.0, provided that when the vinyl polymer or synthetic rubber is used as the active hydrogen-containing component the OH value of the vinyl polymer or synthetic rubber is at least 10, and that when said vinyl polymer is used as the active hydrogen-containing component, said vinyl polymer is a copolymer formed from up to 10 mole% of an hydroxy group-containing monomer and at least 90 mole% of other vinyl monomer.

3,914,336
TIN-VANADIUM POLYESTER ACCELERATOR SYSTEM

John G. Baker, Cheswick, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 33,482, April 30, 1970, abandoned. This application Jan. 30, 1974, Ser. No. 438,057
Int. Cl.[2] C08L *67/06*; C08F *283/00*
U.S. Cl. 260—863 **12 Claims**

1. A composition comprising:
   A. a liquid copolymerizable, ethylenically-unsaturated monomer;
   B. an unsaturated polyester of:
      1. a chlorinated or brominated dicarboxylic acid or anhydride,
      2. an alpha, beta-ethylenically unsaturated dicarboxylic acid or anhydride, and
      3. a polyhydric alcohol; and
   C. an effective amount of an accelerator mixture of:
      1. a soluble stannous salt, and
      2. a soluble vanadium salt.

3,914,337
POLYBLENDS COMPRISING S-A COPOLYMER AND GRAFT COPOLYMER OF S-A-ACRYLATE ONTO A DIENE RUBBER

Brandford E. Giddings, Warrensville Heights, and Irving Rosen, Painesville, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

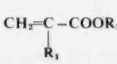
Continuation-in-part of Ser. No. 325,205, Jan. 19, 1973, abandoned. This application May 2, 1973, Ser. No. 356,581
Int. Cl.[2] C08L *51/04*
U.S. Cl. 260—876 R **10 Claims**

1. The polymeric composition resulting from blending
   A. a polymer resulting from the polymerization of a monomer component consisting of
      1. from about 70 to 90% by weight of an alpha, beta-olefinically unsaturated mononitrile having the structure

      wherein R is a member selected from the group consisting of hydrogen, a lower alkyl group having from 1 to 4 carbon atoms and a halogen, and
      2. from 10 to 30% by weight based on the combined weights of (1) and (2) of styrene with
   B. a polymer resulting from the polymerization of 100 parts by weight of
      1. from 50 to 90% by weight of an alpha, beta-olefinically unsaturated mononitrile having the structure

wherein R has the foregoing designation,

2. from 1 to 35% by weight of styrene, and
3. from 2 to 29% by weight of an ester of an olefinically unsaturated carboxylic acid having the structure



wherein R_1 is hydrogen, an alkyl group having from 1 to 4 carbon atoms, and a halogen, and R_2 is an alkyl group having from 1 to 6 carbon atoms in the presence of from 20 to 600 parts by weight of

4. a rubbery copolymer of a conjugated diene monomer selected from the group consisting of butadiene and isoprene and at least one member selected from the group consisting of an olefinically unsaturated mononitrile having the structure

wherein R has the foregoing designation and styrene, said rubbery copolymer containing from 50 to 95% by weight of polymerized conjugated diene monomer and from 50 to 5% by weight of the other monomer component.

3,914,338

OPALESCENT METHYLMETHACRYLATE POLYMER BODIES

Manfred Krieg, Darmstadt; Norbert Suetterlin, Griesheim, and Hans-Dieter Blitz, Darmstadt-Arheilgen, all of Germany, assignors to Rohm GmbH, Darmstadt, Germany

Filed Dec. 26, 1973, Ser. No. 428,011

Claims priority, application Germany, Dec. 30, 1972, 2264224

Int. Cl.² C08L *51/00*

U.S. Cl. 260—876 R **6 Claims**

1. An opalescent body of polymethylmethacrylate or of a copolymer comprising at least 50 percent by weight of methyl methacrylate, the balance being a vinyl or vinylidene comonomer copolymerizable therewith, said body having opalescing particles dispersed therein in an amount from about 0.1 to 5 percent by weight of said body, said particles consisting essentially of a core, greater than about 0.8 in diameter, of cross-linked polystyrene or of a cross-linked copolymer comprising at least 50 percent by weight of styrene, the balance being a vinyl or vinylidene comonomer forming a homopolymer whose index of refraction n_D^{20} is greater than 1.50, said core being cross-linked by the presence therein of about 0.5 to 5 percent, by weight of styrene or monomer mixture predominantly comprising styrene, of a member selected from the group consisting of N-alkoxy alkyl methacrylamides and ethylenically unsaturated monomers having at least two carbon-carbon double bonds in the molecule, said core further being surrounded by a graft-copolymerized shell of polymethylmethacrylate or of a copolymer comprising at least 50 percent by weight of methyl methacrylate, the balance being a vinyl or vinylidene comonomer copolymerizable therewith, the volume fraction of said shell being at least 30 percent and up to 90 percent of the total volume of said particles.

3,914,339

PROCESS FOR PRODUCING RUBBER-MODIFIED PLASTICS

Takesaburo Shima, Toyonaka; Sukehiko Sakamoto, and Yoshikazu Fujii, both of Ibarak, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Continuation of Ser. No. 154,636, June 18, 1971, abandoned. This application July 23, 1973, Ser. No. 381,522

Claims priority, application Japan, June 24, 1970, 45-55526

Int. Cl.² C08L *9/00, 23/06, 23/08, 23/16*

U.S. Cl. 260—880 R **18 Claims**

1. A process for producing rubber-modified plastics excellent in impact strength and color rendering which comprises dissolving rubber into a mixture of vinyl monomers containing acrylonitrile and styrene, subjecting the resultant solution to bulk polymerization under heating without using any polymerization initiator until the total conversion of the vinyl monomers reaches a range of 3.5 to 15 % by weight, adding a chain transfer agent to the resulting reaction mixture, continuing the bulk polymerization until the total conversion of the vinyl monomers reaches a range of 20 to 40 % by weight, and subjecting the thus prepared prepolymer to suspension polymerization in the presence of lauroyl peroxide as a polymerization initiator.

3,914,340

BLOCK COPOLYMERIZATION WITH AZOAMIDINO COMPOUNDS AS INITIATOR

Henri G. G. Dekking, Rootstown, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

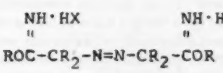
Division of Ser. No. 42,894, June 2, 1970. This application Sept. 25, 1972, Ser. No. 292,140

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² C08L *27/06*

U.S. Cl. 260—884 **9 Claims**

1. The method which comprises block copolymerizing at least two different polymerizable ethylenically unsaturated monomers to produce a block copolymer capable of forming a film, said block copolymerization being in contact with an initiator in an amount sufficient to effect polymerization and ranging from 0.0001 to 0.1 part by weight of initiator per part of total monomers, said initiator consisting essentially of the reaction product at 0°C. to 25°C. of an azodiimidoether hydrogen halide of the general fromula



with an organic polyamino compound of the general formula $R''(NR'_2)_2$ wherein each R is an alkyl or cycloalkyl group of one to six carbon atoms, each R′ is a hydrogen atom or an aliphatic monovalent hydrocarbon group free of aliphatic unsaturation and labile hydrogen atoms, at least one R′ in said organic polyamino compound being a hydrogen atom, each R″ is a divalent group free of aliphatic unsaturation and labile hydrogen atoms and composed of atoms selected from the class consisting of carbon, hydrogen and nitrogen, there being at least two carbon atoms in each R″ group, and each X is a halogen atom, said reaction being with from one to two moles of organic polyamino compound per mole of azodiimidoether hydrogen halide.

3,914,341

HYDROGEL AND METHOD OF MANUFACTURING THE SAME

Karel Kliment, Princeton, N.J.; Richard Chromecek, Litchfield, Conn.; Miroslav Stol, Prague, Czechoslovakia; Vladimir Stoy, Prague, Czechoslovakia, and Eva Gavrilova, Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 1,546, Jan. 8, 1970, abandoned. This application Dec. 26, 1972, Ser. No. 318,185

Claims priority, application Czechoslovakia, Jan. 14, 1969, 21869-69

Int. Cl.[2] C08L *31/02*

U.S. Cl. 260—885 8 Claims

1. A hydrogel comprising a copolymer formed of a major portion of a monomer mixture consisting essentially of a glycol methacrylate selected from the group consisting of alkylene glycol methacrylate and dialkylene glycol methacrylate and less than 2% by weight of a glycol dimethacrylate crosslinking agent selected from the group consisting of alkylene glycol dimethacrylate and dialkylene glycol dimethacrylate and a minor portion of up to 35% by weight of said monomer mixture of a filler consisting of a polymer prepared by polymerizing a glycol methacrylate selected from the group consisting of alkylene glycol methacrylate and dialkylene glycol methacrylate and more than 2% by weight of a glycol dimethacrylate crosslinking agent selected from the group consisting of alkylene glycol dimethacrylate and dialkylene glycol dimethacrylate, the relative amounts of crosslinking agent in said filler being at least 2% greater than the relative amount of crosslinking agent in said monomer mixture.

3,914,342

ETHYLENE POLYMER BLEND AND POLYMERIZATION PROCESS FOR PREPARATION THEREOF

John H. Mitchell, Brazoria, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 162,313, July 13, 1971, abandoned. This application June 10, 1974, Ser. No. 478,124

Int. Cl. C08f *37/18*

U.S. Cl. 260—897 A 8 Claims

1. A normally solid, homogeneous, high impact, high density ethylene polymer blend comprising a major amount of intermediate molecular weight, high density ethylene polymer consisting essentially of ethylene and optionally other α-olefin comonomer units and a minor amount of at least about 3 weight percent based on the blend of high molecular weight, non-elastomeric ethylene/α-olefin copolymer having a crystallinity of at least 5 percent and an α-olefin comonomer content from about 12 to about 40 weight percent based on the copolymer, said high molecular weight copolymer having (1) melt flow viscosity value not greater than about one-fifth the melt flow viscosity value of said intermediate molecular weight polymer and (2) an α-olefin comonomer content at least about 3 times on a weight basis of any α-olefin comonomer content of said intermediate molecular weight polymer, both of said ethylene polymers having been prepared under solution polymerization conditions and blended in the liquid state.

3,914,343

PHOSPHORIC ACID ESTERS OF 5-(2-AMINOETHOXY)-ARVACROLS

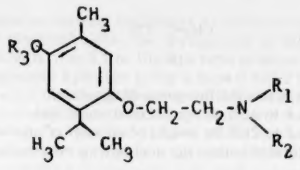
Karl-Otto Vollmer, Freiburg, and Manfred Herrmann, Gundelfingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed July 20, 1973, Ser. No. 381,140

Int. Cl.[2] C07F *9/09*; A01N *9/36*

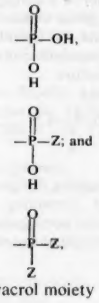
U.S. Cl. 260—945 7 Claims

1. Phosphoric acid esters of 5-(2-amino-ethoxy)-carvacrols of the formula:

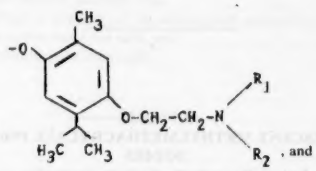


I

wherein R_1 is selected from the group consisting of hydrogen and lower alkyl radicals and R_2 is selected from the group consisting of hydrogen and lower alkyl radicals and R_3 is a residue of phosphoric acid selected from the group consisting of:



wherein Z is the carvacrol moiety



wherein R_1 and R_2 have the same meaning given above and the pharmaceutically compatible salts thereof.

3,914,344

PHOSPHORIC ACID ANILIDES

Kurt Schwarzenbach, Pfeffingen, and Siegfried Rosenberger, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

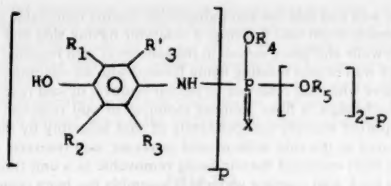
Filed Mar. 20, 1974, Ser. No. 452,907

Claims priority, application Switzerland, Mar. 27, 1973, 4402/73

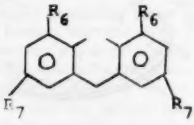
Int. Cl.[2] C07F *9/24*

U.S. Cl. 260—953 10 Claims

1. A compound of the formula



in which R_1 is a straight-chain or branched alkyl group with 1–8 carbon atoms, a cycloalkyl group with 6–8 carbon atoms, or an aralkyl group with 7–9 carbon atoms in which the aryl portion is phenyl, R_2 is hydrogen, a straight-chain or branched alkyl group with 1–8 carbon atoms, a cycloalkyl group with 6–8 carbon atoms or an aralkyl group with 7–9 carbon atoms, in which the aryl portion is phenyl, R_3 and R_3' independently of one another are hydrogen or an alkyl group with 1–4 carbon atoms, R_4 and R_5 independently of one another are a straight-chain or branched alkyl group with 1–22 carbon atoms, a cycloalkyl group with 5–8 carbon atoms, a halogenalkyl group with 2–18 carbon atoms, an alkylthioalkyl group with 3–21 carbon atoms, an alkoxyalkyl group with 3–21 carbon atoms, an alkoxycarbonylalkyl group with 3–5 carbon atoms, an alkenylgroup with 3–4 carbon atoms, the phenylgroup, the chlorophenyl group, an alkylphenylgroup with 7–14 carbon atoms or an aralkyl group with 7–15 carbon atoms or R_4 and R_5 together are 1,2- or 1,3-alkylene or 2–8 carbon atoms, o-arylene with 6–10 carbon atoms or the



group wherein R_6 and R_7 are alkyl groups with 1–4 carbon atoms, X is oxygen or sulphur and p is 1 or 2.

3,914,345

PROCESS FOR THE MANUFACTURE OF DIALKYL-PHOSPHINIC ACID ESTERS

Hans-Jerg Kleiner, Bad Soden, and Franz Landauer, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation-in-part of Ser. No. 215,900, Jan. 6, 1972, abandoned. This application Dec. 21, 1973, Ser. No. 427,253

Claims priority, application Germany, Jan. 8, 1971, 2100779

Int. Cl.² C07F 9/32

U.S. Cl. 260—970 **9 Claims**

1. A process for the preparation of a compound of the formula

in which R_1 is alkyl of 2 to 22 carbon atoms and R_2 and R_3 are alkyl of 1 to 22 carbon atoms, which comprises reacting a phosphonous acid ester of the formula

in which R_2 and R_3 are defined as above, with an α-monoalkene of 2 to 22 carbon atoms containing less than 0.002 % by weight of organically linked sulfur in the presence of a free radical generator at a temperature of 130° to 250°C.

3,914,346

METHOD OF ESTERIFICATION OF ALKYL PHOSPHONOTHIO DIHALIDES

Harold M. Pitt; Richard A. Zeleny, both of Lafayette, and Wendell E. Knoshaug, Albany, all of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Division of Ser. No. 324,912, Jan. 19, 1973, Pat. No. 3,873,647, which is a continuation of Ser. No. 784,209, Dec. 16, 1968, abandoned. This application May 9, 1974, Ser. No. 468,351

Int. Cl.² C07F 9/14

U.S. Cl. 260—973 **3 Claims**

1. Reacting a compound of the formula

wherein R_2 is lower alkyl having from 1 to 4 carbon atoms with sodium alkylate of the formula, $NaOR_1$, wherein R_1 is alkyl from 1 to 4 carbon atoms at a temperature between about 110 and about −40°C., and in the presence of from 0.1 to about 5% water to produce a monoester in accordance with the formula

---

3,914,347

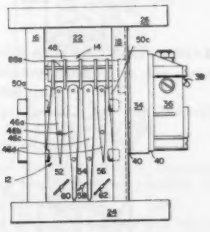
PLATELET-INJECTOR VENTURI CARBURETOR FOR INTERNAL COMBUSTION ENGINES

David L. Kors, El Dorado Hills; Billy R. Lawver, Rancho Cordova, and John F. Addoms, Rocklin, all of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed July 23, 1973, Ser. No. 381,966

Int. Cl.² F02M 13/04

U.S. Cl. 261—23 A **11 Claims**



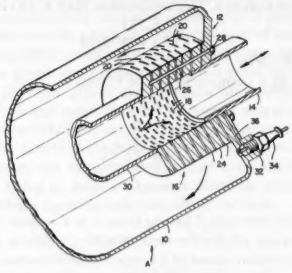
1. A carburetor for an internal combustion engine comprising a venturi assembly defining a plurality of air diffuser channels of narrow rectangular cross-sectional flow area and a fuel injector assembly including a plurality of generally rectangular injector plates each having a plurality of small fuel injection orifices at the lower portion thereof, each of said injector

plates comprising a plurality of platelet elements together defining fuel flow passages interconnecting a fuel source with said injector orifices, said injector plates being so positioned with respect to said diffuser channels that said orifices are located therein at the throat portion thereof to introduce fuel thereat in the form of finely atomized droplets.

3,914,348
PLATELET-VENTURI CARBURETOR FOR COMBUSTION ENGINE

David L. Kors, El Dorado Hills; John F. Addoms, Penryn, and Billy R. Lawver, Rancho Cordova, all of Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed Feb. 25, 1974, Ser. No. 445,511
Int. Cl.² F02M *19/10*; F02C *3/24*
U.S. Cl. 261—23 A **18 Claims**

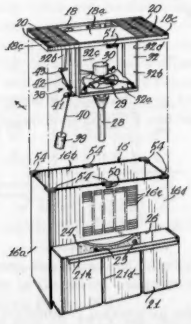


1. A carburetor comprising: a housing having an air inlet and a fuel inlet, and a platelet stack in said housing defining a plurality of venturis, said venturis being defined in planes parallel to the platelets of said stack, said stack having a plurality of fuel passages placing said fuel inlet in fluid communication with respective venturis, said platelet stack being disposed with the inlets of said venturis communicating with said air inlet.

3,914,349
PORTABLE HUMIDIFIER

John M. Stipanuk, Glen Ellyn, Ill., assignor to Sunbeam Corporation, Chicago, Ill.

Filed Apr. 23, 1973, Ser. No. 353,312
Int. Cl.² B01F *3/04*
U.S. Cl. 261—29 **9 Claims**

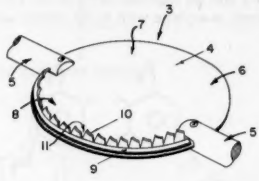


1. A humidifier comprising a housing having front, side, back and bottom walls; a removable closure wall for the top of said housing; a motor driven fan and pump supported entirely by said closure wall on the underside thereof; said closure wall and said fan and pump being readily removable as an assembly from said housing; a reservoir having side and bottom walls and being nested in the bottom of said housing; said back wall of said housing being formed with an opening coextensive with said reservoir to permit removal of said reservoir therethrough; a filter element mounted in said reservoir and supported entirely independently of said assembly by means secured to the side walls of said reservoir; said reservoir with said filter mounted therein being removable as a unit through said back wall opening when said assembly has been removed from said housing; said filter element surrounding said pump and positioned to receive water thrown outwardly by said pump; and means on said assembly associated with said fan directing air through said filter element to humidify said air; said last-mentioned means engaging said filter element but not being connected thereto.

3,914,350
CARBURETOR THROTTLE VALVE WITH FUEL RE-SPRAYER

An Sang-Yol, Seoul, South Korea, assignor to Hyundai Motor Company, Seoul, South Korea

Filed July 9, 1974, Ser. No. 486,797
Claims priority, application South Korea, Aug. 13, 1973, 4616
Int. Cl.² F02M *29/14*
U.S. Cl. 261—65 **8 Claims**

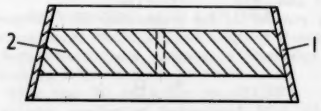


1. A throttle valve for a carburetor comprising a disc, diametrically extending support shafts rigidly attached to the disc and dividing the disc into two halves, a semicircular shell belt attached to one half of the disc adjacent the periphery of the disc and extending in a direction substantially normal to one surface of the disc and a plurality of teeth arranged in a semicircle adjacent the belt on the side of the belt remote from the periphery of the disc, the teeth being attached to and extending from said surface, curved in a plane parallel to said surface with the inside of the curve facng the center of the disc and being spaced by V-shaped notches.

3,914,351
PACKED TOWER AND METHOD OF OPERATION

Kevin Joseph McKeown, New Castle; Stephen Robert Mercer Ellis, and Ronald Priestley, both of Birmingham, all of England, assignors to Mass Transfer Limited, Westmoreland, England

Filed Mar. 2, 1973, Ser. No. 337,702
Int. Cl.² B01F *3/04*
U.S. Cl. 261—98 **14 Claims**



1. Fluid-fluid contact apparatus comprising a packed bed and means for introducing fluids to said bed for contact therein in which at least a part of said bed is a dumped bed formed of a plurality of packing elements each including a

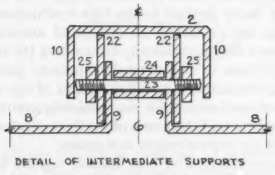
tubular member terminating in opposite ends, each of said ends having a diameter to width ratio greater than 1.5:1 and in which the diameter of one end of the tubular member is greater than that of the other end thereof, said element having a plurality of radial ribs extending from the centre of the tubular member to the side wall thereof, and wherein said ribs do not extend beyond the ends of said tubular member.

3,914,352

BUBBLE CAP TRAY

Salvatore A. Guerrieri, Newark, Del., assignor to University of Delaware, Newark, Del.

Filed Dec. 26, 1973, Ser. No. 427,481
Int. Cl.² B01D *3/20*
U.S. Cl. 261—114 TC **5 Claims**



DETAIL OF INTERMEDIATE SUPPORTS

1. In a liquid-vapor contacting tower comprising a shell closed at top and bottom, inlet and outlet connections for all liquid and vapor streams into and out of the tower, a plurality of tray support means attached to the tower shell at vertically spaced levels, and a plurality of vapor-liquid contacting means, mounted on said tray support means comprising an assembly of troughs of two different widths each trough having a cross section shaped approximately like a block U, the wide ones, forming the tray floor and chimneys, being spaced from each other with the legs of the troughs pointing upward and the space between two adjacent troughs being closed at each end by a spacer piece whereby the combination of the legs of two adjacent troughs and the two end spacers form a long, low, narrow chimney including intermediate spacers where necessary to provide strength and rigidity to the assembly; and the narrow troughs, with each end closed by end pieces and with legs pointing downward to form caps which are placed over the chimneys, thereby providing a continuous vapor passage connecting the space below said assembly with the space above it, wherein the wide troughs are uniformly spaced across the diameter of the tower with their long axes parallel to each other and to the direction of the liquid stream from the tray's liquid inlet to the outlet, the improvement wherein the elements comprising said intermediate spacers include a stud bold surrounded by a spacer having a length equal to the width of the chimney at least one cap support member having a height equal to the inside height of the cap above the tray trough with a hole matching the bolt hole in the adjacent leg of the tray trough, and means to fasten together said elements.

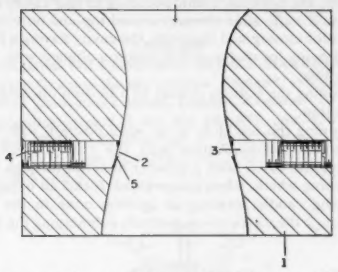
3,914,353

SONIC VENTURI VAPORIZOR

Kenneth Floyd Cherry, 4406 Suder Ave., Toledo, Ohio 43611

Filed Apr. 1, 1974, Ser. No. 456,550
Int. Cl.² F02M *27/08*
U.S. Cl. 261—1 **1 Claim**

1. An atomization device comprising in combination a venturi with at least one resonant chamber, said chamber connected into said venturi by means of an opening, said opening including means so constructed as to induce sufficient disturbance into an air stream flowing through said venturi as to result in resonance within said resonant chamber, said



resonance to project a sonic wave into the area within said venturi.

3,914,354

PROCESS FOR PRODUCING FINE FIBROUS STRUCTURES

Shiro Ueki, and Yoshimitsu Miyata, both of Yokkaichi, Japan, assignors to Kabushiki Kaisha Oki Yuka Goeishi Kenkyujo, Tokyo, Japan

Continuation of Ser. No. 182,524, Sept. 21, 1971, abandoned.
This application Sept. 20, 1973, Ser. No. 399,138
Claims priority, application Japan, Sept. 25, 1970, 45-83937
Int. Cl.² B29C *23/00*
U.S. Cl. 264—13 **13 Claims**

1. A process for producing fine fibrous structures which comprises the steps of:

1. preparing a heterogeneous aqueous dispersion system comprising a molten polyolefin dispersed therein in a quantity of from 5 to 70 percent by weight of the aqueous dispersion system, water, and a substantially water-immiscible positive solvent for the polymer, said molten polyolefin containing water and a fine water-sorption agent which is inherently solid in a quantity of from 20 to 80 percent by weight of the polyolefin; said positive solvent being in a quantity of less than 50% by weight of the polymer, at least a part of which is present within the molten polyolefin, and
2. passing said aqueous dispersion system from a high-pressure region at a temperature above the melting point of the polymer and below the critical temperature of said aqueous dispersion system and at a pressure above the saturated vapor pressure of said system into a low-pressure region at a temperature and pressure at which the liquid phase within the dispersion system can evaporate thereby to produce a fine fibrous structure of the polymer.

3,914,355

CHLORATE CANDLE AND METHOD OF MAKING SAME

Tommy Lewis Thompson, Melbourne, Fla., assignor to Life Support, Inc., Melbourne, Fla.

Filed Sept. 6, 1973, Ser. No. 394,689
Int. Cl.² C06B *21/00*
U.S. Cl. 264—3 R **2 Claims**

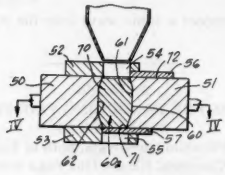
1. The method of manufacturing a compressed oxygen producing candle by horizontal compression molding in a fixture which comprises steps of:

providing a fixture with top, bottom and two opposed stationary side walls, and two opposed horizontally movable second walls positioned between the stationary walls, the side walls being spaced from one another, and the second walls being spaced from one another deferring a cavity between the side and second walls, the opposed surfaces of the second walls being contoured to provide non-continuously planar die surfaces,

providing top and bottom openings through fixture portions connecting the side walls above and below the second walls, the openings communicating to said cavity defined by said walls, slide closures at said top and bottom openings for closing said openings, the cavity having a first size and being located at a first position aligned with the top opening;

positioning the bottom closure in a bottom opening closed position,

positioning the top slide in an open position with the top opening communicating with the cavity, substantially filling the cavity with a powder material through the top opening which, when compressed, forms an oxygen producing candle, placing an ignition cone in the cavity, through the top opening, partially submerging the ignition



cone in the powder metal, moving the top slide to a closed position closing the top opening, shifting the cavity to a second cavity position remote from the first cavity position and remote from the top and bottom openings by horizontal movement of the second walls, reducing the size of the cavity to a second size less than the first size while compressing the powder material to form a compressed candle with an ignition cone embedded in the candle at the top thereof by horizontal movement of the second walls, increasing the cavity to a third size larger than the second size and shifting the cavity back to the first position by horizontal movement of the second walls, moving the bottom slide to an open position communicating the bottom opening with the cavity, and removing the compressed candle from the cavity through the bottom openings.

3,914,356

METHODS OF AND APPARATUS FOR CONTROLLING THE THICKNESS OF AN ANNULAR EXTRUSION

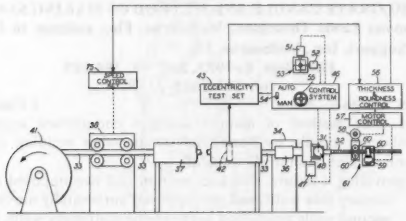
Matthew R. Dembiak, Clifton, and John J. Glosek, Roselle, both of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Mar. 28, 1974, Ser. No. 455,775

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B29C *3/06*

U.S. Cl. 264—40 **15 Claims**



1. A method of extruding an elongated annular article, wherein a first mechanism controls the uniformity of the wall thickness of diametrically opposite quadrants of the article with respect to the wall thickness of the quadrants adjacent thereto, and a second mechanism controls the average value of the wall thickness of the four quadrants of the article, the method comprising:

generating first and second signals indicative, respectively, of

a. an increase of the average value of the wall thickness in diametrically opposite quadrants of the article with respect to the average value of the wall thickness in the other two quadrants beyond a predetermined acceptable range, and

b. a deviation of the average value of the wall thickness from a predetermined thickness range;

applying the first signals to the first mechanism to increase the uniformity of the wall thickness;

applying the second signals to the second mechanism to change the average thickness of the article to a value within the thickness range; and

blocking the second signals from being applied to the second mechanism upon the average wall thickness exceeding the predetermined thickness range while the first signals are being applied to the first mechanism.

9. Apparatus for extruding an elongated annular article, including a means for mechanically controlling the uniformity of the wall thickness of diametrically opposite quadrants of the article with respect to the wall thickness of the quadrants adjacent thereto, and means for mechanically controlling the average value of the wall thickness of the four quadrants of the article, wherein an improvement comprises:

means for generating first and second signals indicative, respectively, of

a. an increase of the average value of the wall thickness in diametrically opposite quadrants of the article with respect to the average value of the wall thickness in the other two quadrants beyond a predetermined acceptable range of values, and

b. a deviation of the average value of the wall thickness from a predetermined thickness range;

means, coupled to the means for mechanically controlling the uniformity of the wall thickness, for translating the first signals into mechanical motion;

means for applying the first signals to the signal translating means to increase the uniformity of the wall thickness;

means for applying the second signals to the means for controlling the average wall thickness to alter the operation thereof and to change the average thickness of the article to a value within the thickness range; and

means rendered effective upon the average wall thickness exceeding the values of the thickness range while the first signals are being applied to the signal translating means for blocking the second signals from being applied to the means for controlling the average wall thickness.

3,914,357

METHOD OF MONITORING THE APPLICATION OF CELLULAR PLASTIC INSULATION TO ELONGATED CONDUCTIVE MATERIAL

Manuel Ramon Cereijo, Atlanta, and Timothy Stephen Dougherty, Norcross, both of Ga., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Jan. 4, 1973, Ser. No. 321,082

Int. Cl.[2] B29D *27/00;* **B29F** *3/10*

U.S. Cl. 264—40 **15 Claims**

1. A method of monitoring the application of an insulation, which includes a layer of cellular insulation, to an elongated conductive material, which includes the steps of:

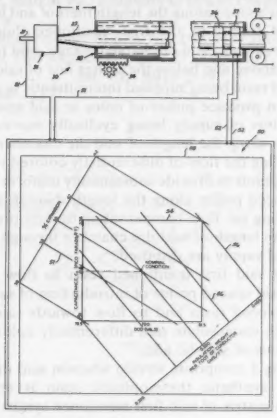
advancing an elongated material;

covering the elongated material with at least a layer of the cellular insulation material;

measuring the capacitance and the associated diameter of the insulated elongated material;

generating electrical signals related to the measured capacitance and associated diameter of the insulated elongated material; and

utilizing the signals to control the weight of insulation per length of elongated material and the percent of voids in



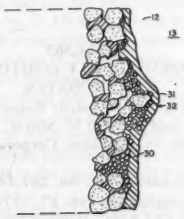
the cellular insulation material to maintain the capacitance and associated diameter within specified ranges.

3,914,358

METHOD OF IMPROVING THE FINISH OF THE BORES OF A REVERSE OSMOSIS SAND MODULE

George D. Dixon, Monroeville, and Hugh A. Nelson, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1973, Ser. No. 423,641
Int. Cl.[2] B29D *27/04*
U.S. Cl. 264—41 **11 Claims**



1. A method of making a liquid purification module comprising a supported semipermeable membrane comprising the steps of:

A. providing an open sore support module made of bonded, resin-coated filler particles having a granular structure and an average particle size between about 40 and 500 microns, the resin coating constituting about 1 to 18 percent of the coated filler particle weight, the module having at least one feed bore extending from end to end therethrough;

B. applying a thin coating of a finishing composition to the entire surface of the interior feed bore walls, said finishing composition comprising filler particles coated with a resinous material and having a granular structure and an average particle size between about 0.5 and 30 microns, the resinous material constituting about 0.5 to 10 percent of the coated filler particle weight;

C. drying the finishing composition coating to form a porous coating bonded to the bore walls; and finally

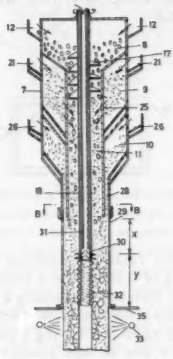
D. applying a polymeric semipermeable membrane to the interior finished bore walls to provide a porous liquid purification module.

3,914,359

BUILDING OR CONSTRUCTIONAL MATERIAL

Christopher Graham Bevan, London, England, assignor to C. G. Bevan Associates Limited, London, England

Continuation-in-part of Ser. No. 103,575, Jan. 4, 1971, abandoned. This application Apr. 4, 1973, Ser. No. 347,904
Int. Cl. B28b *1/08, 1/52*
U.S. Cl. 264—45.3 **13 Claims**



1. A method of forming a panel product from constituents including a mixture of liquid setting powder and a fibrous reinforcing material, and partially heat-expanded cellular beads of a heat-expansible polymer, said method comprising introducing said constituents in a dry, flowable state into a mould in layers including a first layer comprising said powder and fibre mixture, and a second layer comprising said beads, while confining the introduced constituents within the mould, permeating the constituents with steam,

by said permeating simultaneously moistening the powder and heating the beads, and

by said moistening, effecting setting of the powder, and by said heating, simultaneously expanding the beads to apply internal pressure on all of the constituents within the mould, which pressure compacts the constituents into a coherent mass forming said panel.

3,914,360

EXPANSION OF EXPANDABLE SYNTHETIC RESINOUS MICROSPHERES

Roland E. Gunderman, Clare, and Ritchey O. Newman, Jr., Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 23, 1973, Ser. No. 353,267
Int. Cl.[2] C08J *9/16*
U.S. Cl. 264—51 **3 Claims**

1. In a method for the expansion of synthetic resinous microspheres, the steps of the method comprising providing a plurality of expandable synthetic resinous thermoplastic microspheres in association with a liquid dispersing medium wherein the micrsophere/dispersing medium mixture is flowable under pressure wherein the concentration of expandable microspheres in the dispersing medium is from about 7 to about 30 volume percent, heating the mixture of dispersing medium and microspheres to a temperature sufficient to cause expansion of the synthetic resinous thermoplastic microspheres to form a plurality of monocellular gas-filled synthetic resinous particles, the improvement which comprises

heating the microspheres by passing the dispersing medium/expandable microsphere mixture through a heated interfacial surface generator.

3,914,361
METHOD FOR ROTATIONAL MOLDING OF COMPOSITE FOAMED PLASTIC ARTICLES

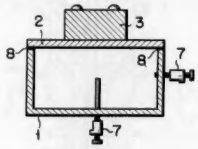
Naonori Shiina, Tokyo, and Kirokuro Hosoda, Yokohama, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed June 27, 1973, Ser. No. 373,917

Claims priority, application Japan, June 29, 1972, 47-65183; Aug. 17, 1972, 47-82327; Nov. 7, 1972, 47-11518

Int. Cl.[2] B29C *5/04, 5/12;* **B29D** *27/00*

U.S. Cl. 264—45.4 **7 Claims**



1. A method for rotational molding of plastic composite articles consisting of a crust and a foamed core; comprising charging a plastic material comprising a mixture of a thermoplastic powder and a thermoplastic particulate material containing a foaming agent and having a particle size at least 30 times the particle size of said powder in an airtight mold provided with a valved tube extending into the interior of the mold, rotating the mold at such a speed that every section of the mold travels a rotational speed less than 15 meters per minute, heating the mold from the outside with steam having a temperature between about 100°C and 250°C at least until said powder has melted and formed a crust upon the inner surface of the mold and said particulate material has contacted the inner surface of the crust, expanding said particulate material to form a foamed core, and cooling the mold after expelling gas present in the interior of the mold through said valved tube.

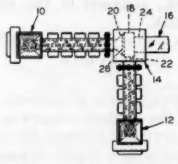
3,914,362
METHOD FOR PRODUCING MULTICOLOR PATTERNS IN SYNTHETIC PLASTIC SHEET MATERIAL

Robert E. Randall, Kensington, Conn., assignor to Rowland Products, Inc., Kensington, Conn.

Division of Ser. No. 273,732, July 21, 1972, Pat. No. 3,792,945. This application Oct. 31, 1973, Ser. No. 411,302

Int. Cl. B29f *1/12, 3/12*

U.S. Cl. 264—75 **9 Claims**



1. In a method for fabricating synthetic thermoplastic sheet material having differentially colored bands therein extending along the length thereof, the steps comprising:

a. providing an elongated die chamber having an extrusion orifice and a discharge passage communicating therebetween;

b. supplying fluid synthetic thermoplastic resin to said die chamber at a point spaced from said discharge passage;

c. supplying a differentially colored fluid synthetic thermoplastic resin at a multiplicity of points in said die chamber spaced along the length thereof and between the point of supply of the first mentioned fluid synthetic plastic resin and said discharge passage, said points being spaced above and below the center line of said die chamber, said resin being supplied intermittently at said spaced points to produce pulses of color at said spaced points, said points of supply being cyclically moved a limited distance along the length of said die chamber;

d. controlling the flow of differentially colored resin to said spaced points to provide substantially uniform amounts to said spaced points along the length thereof, said step of controlling the flow compensating for any pressure drop along the length of said die chamber through which said points of supply are disposed;

e. causing said first mentioned resin to flow above and below said spaced points of introduction of said differentially colored resin and to flow towards said points of supply to encapsulate said differentially colored resin at said points of supply; and

f. extruding a composite stream wherein said differentially colored synthetic thermoplastic resin is encapsulated within a matrix of said first mentioned synthetic thermoplastic resin, the movement of said spaced points of supply along the length of said chamber above said chamber line being in a direction opposite to that of the points below said center line whereby said differentially colored synthetic thermoplastic resin provides intersecting bands of differential color along the length of the extruded composite stream.

3,914,363
METHOD OF FORMING SELF-LIMITING CONDUCTIVE EXTRUDATES

Ronald L. Bedard, San Leandro; Robert Smith-Johannsen, Portola Valley, and Wendell W. Moyer, Jr., Atherton, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 287,442, Sept. 8, 1972, abandoned. This application Jan. 17, 1974, Ser. No. 434,277

Int. Cl.[2] B29C *25/00;* **B29F** *3/10*

U.S. Cl. 264—105 **10 Claims**

1. In the method of forming a self-regulating conductive article in which a composition comprising a crystalline thermoplastic polymeric material and not more than about 15% carbon based on the total weight of said composition is extruded onto a pair of elongate parallel electrodes held in spaced-apart relation to form an electrode interconnecting web and in which the extrudate is thereafter annealed at a temperature at or above the crystalline melting point of said polymeric material and greater than 250°F for a time sufficient to reduce the room temperature resistivity thereof to within the range from about 5 to about 100,000 ohm-cm, the improvement wherein prior to annealing an electrically insulative surrounding layer is extruded onto said extrudate, said layer consisting essentially of a thermoplastic material incompatible with said polymeric material, shape-retaining at the temperature of annealing, and which when combined with the initial extrudate and brought from room temperature to annealing temperature is subjected to an appreciable degree of residual stress.

3,914,364

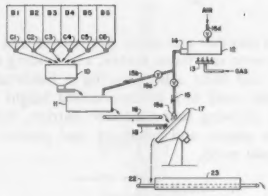
METHOD OF PELLETIZING GLASS BATCH MATERIALS

William H. Engelleitner, Coraopolis, and Samuel B. Floyd, Jr., Wexford, both of Pa., assignors to Dravo Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 167,342, July 29, 1971, abandoned. This application Dec. 27, 1973, Ser. No. 428,881

Int. Cl.[2] B01J 2/14

U.S. Cl. 264—117 5 Claims



1. A method of forming pellets of raw glass batch ingredients for use in producing a glass having SiO_2 as the principal constituent with Na_2O and an oxide selected from the group consisting of CaO, MgO and mixtures thereof as the other most important constituents percentage-wise in the glass formula comprising

a. preparing a mixture of:

i. a naturally occurring washed silica sand otherwise in its as-mined state which has less than 1% of particles by weight under 325 screen mesh size and only about 3.2% of particles under 200 mesh, the remainder of the particles in the sand being in the range between 50 and 200 mesh;

ii. ground limestone selected from the group consisting of calcium carbonate and calcium-magnesium carbonate and mixtures thereof, the ground limestone comprising between 67.5to 77.5% by weight of particles under 325 mesh, 86.5% under 200 mesh, the remaining particles being in the range of 50–200 mesh;

iii. the silica and limestone being combined in such proportions that there are no solid particles in the mix above 30% mesh, but at least 15% by weight of all particles are of −325 mesh size and 25% of all particles are of −200 mesh and the greatest percent by weight of all particles is in the range between 100 mesh and 200 mesh;

b. continuously feeding said mix in a free-flowing unagglomerated condition onto a rotating pelletizing disk;

c. continuously supplying to the mix a sodium hydroxide solution ranging between 50 and 73% concentration in a liquid state with at least the greatest proportion of the total amount of the solution necessary to effect bonding being continuously fed directly to the mix on the rotating disk, any proportion of the required sodium hydroxide solution which is not fed directly to the mix on the rotating pelletizing disk being in an amount insufficient to interfere with the free-flowing unagglomerated condition of the solid particles as they are supplied to the disk is supplied to the solid particles in advance of their being supplied to the pelletizing disk;

d. rolling the mixture of solid particles and sodium hydroxide solution on the disk into pellets of substantially uniform composition, the sodium hydroxide constituting the bonding medium for the solid particles and providing at least most of the equivalent Na_2O required by the glass formula;

e. discharging the pellets of selected size from the disk, and

f. drying the pellets.

3,914,365

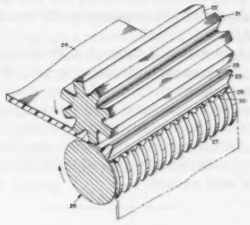
METHODS OF MAKING NETWORK STRUCTURES

Charles W. Kim, Wilmington, and Chia-Seng Liu, Newark, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Filed Jan. 16, 1973, Ser. No. 324,030

Int. Cl.[2] B29H 7/18

U.S. Cl. 264—147 23 Claims



1. A method of making a network structure comprising:

forming in a thermoplastic polymer sheet a number of parallel continuous main ribs interconnected by webs of reduced thickness extending in a first direction on one side thereof and a greater number of parallel tie ribs on the other side thereof extending in a second direction other than said first direction, the ratio of the cross-sectional area of said main ribs to said tie ribs being at least 1.5:1 and the ratio of the height of the main ribs to the thickness of the webs interconnecting said main ribs being at least 3:1, and

drawing said sheet in said first direction to substantially uniformly and continuously orient the main ribs and in another direction transverse to said first direction to orient said tie ribs and to separate said main ribs into main filaments and said tie ribs into tie filaments, said main filaments being continuous and having a substantially uniform cross-section and said tie filaments interconnecting said main filaments to form a uniform network structure.

3,914,366

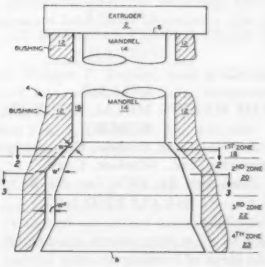
METHOD FOR FORMING A PARISON

Newton R. Wilson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 5, 1973, Ser. No. 338,250

Int. Cl. B29c 17/07; B29d 23/04

U.S. Cl. 264—177 R 4 Claims



1. A method for forming a parison suitable for blow-molding a hollow article having a substantially uniform wall thickness said parison having continuous portions of enlarged

thickness diametrically opposed and substantially free of twisted spacing along the length of said parison, said method comprising forming a blow-moldable plastic material into a first generally cylindrical cross-section by continuously injecting said material into a die having inner and outer walls and thereafter

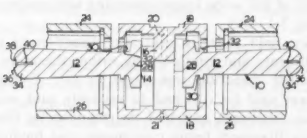
1. forming said material through a first portion of said die to form a cross-section of uniform wall thickness,
2. passing said material through a second portion of the die thereby progressively enlarging the thickness of first and second diametrically opposed portions of the cross-section and then
3. passing said material through a third portion of the die thereby, progressively decreasing said thickness of said enlarged portions to form a further cross-section of uniform wall thickness, and then discharging said material from the die thereby forming a parison comprising continuous portions of enlarged thickness diametrically opposed and substantially free of twisted spacing along the length of said parison.

3,914,367

METHOD OF FORMING INFLATION BLADDER AND ELIMINATING TRAPPED GAS FROM A MOLDED BLADDER SEAM

Larry David Himmelman, Dartmouth, Canada, assignor to Town Tire Services Limited, Canada

Filed Apr. 8, 1974, Ser. No. 459,094
Claims priority, application Canada, Feb. 15, 1974, 192604
Int. Cl.² B29H *5/01*, *7/03*
U.S. Cl. 264—219 **2 Claims**



1. In a process for making an inflatable bladder, in which a pair of disclike sheets of a vulcanizable, elastomeric material are placed on opposite sides of an inner mandrel with outer edge portions touching said mandrel and said material being enclosed within a mold in which vulcanization is effected, the improvement comprising:

forming a channel with a series of generally radially extending blind apertures extending therefrom, in the periphery of the inner mandrel; and vulcanizing said material while causing some of said material from said layers to flow and substantially fill said channel to form a reinforced joint having a seamless outer surface and also during said vulcanizing receiving unwanted gasses from said layers in said blind apertures whereby unwanted gasses are expelled and eliminated from said material being vulcanized.

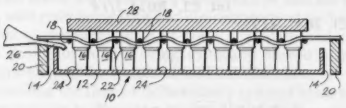
3,914,368

METHOD OF MAKING METAL REINFORCED PLASTIC SCREEN

Richard Ernest Harkness, Hudson, Ohio, assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 24, 1974, Ser. No. 463,705
Int. Cl.² B29D *3/02*
U.S. Cl. 264—219 **6 Claims**

1. A method of making metal reinforced plastic screen including the steps of forming an open topped mold having a base and upwardly extending peripheral walls, positioning a metal screen within the mold in a position parallel to the base, and spaced a small distance thereabove, positioning at least one screen member above the mold, the screen member and the metal screen having openings of the same size, with the openings of the screen member being in alignment with the openings of the metal screen positioning a peg vertically within each of the openings of the screen member and a corresponding opening of the metal screen, each peg having different top and bottom cross-section areas and all pegs being alike in size and shape, upper portions of said pegs being positioned



by said screen member and lower portions of said pegs being out of contact with said metal screen, and holding said pegs in contact with said base while pouring a hardenable plastic material in said mold to a predetermined height above said metal screen, allowing said plastic to harden, removing the pegs from the plastic and removing said plastic and metal screen from said mold.

3,914,369

PROCESS FOR PREPARING SILICONE RUBBER MOLDS FROM LEATHER MASTERS

Frank J. Modic, Scotia, and George M. Dujack, Troy, both of N.J., assignors to General Electric Company, Waterford, N.Y.

Filed June 6, 1974, Ser. No. 476,940
Int. Cl.² B29C *1/02*
U.S. Cl. 264—225 **12 Claims**

1. In a process for preparing a mold from a leather master comprising:

i. casting against a leather master a curable silicone potting composition comprising a diorganovinyl chain-stopped diorganopolysiloxane, an organopolysiloxane copolymer of trimethylsiloxane units, methylvinylsiloxane units and SiO_2 units, a platinum catalyst and a liquid organohydrogenpolysiloxane;

ii. curing said potting composition to produce a silicone rubber; and

iii. separating the leather master from the cured silicone rubber to produce a high precision mold, the improvement which comprises the step of providing the leather master with a barrier coating of a platinum compound capable of catalyzing the addition of Si—H bonds across double and triplebonded carbon to carbon functions, before casting step (i), in an amount sufficient to prevent inhibition of curing step (ii) by inhibitors normally present in the leather master, said barrier coating being applied to said leather master by treatment with a solution of said platinum compound in an organic solvent.

3,914,370

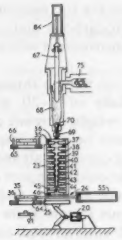
PRODUCTION OF BODIES FROM SYNTHETIC PLASTICS MATERIAL

Brian Edwin Lloyd, Dudley, and Barry John Marsh, Penkridge, both of England, assignors to GKN Group Services Limited, Worcester, England

Division of Ser. No. 229,839, Feb. 28, 1972, Pat. No. 3,809,518. This application Jan. 21, 1974, Ser. No. 435,315
Claims priority, application United Kingdom, Mar. 1, 1971, 5736/71
Int. Cl.² B29F *1/06*
U.S. Cl. 264—297 **6 Claims**

1. A cyclic method of producing solid bodies of a thermoplastic material which shrinks on solidification from a molten state, comprising providing a plurality of mould cavities the plurality having an input end and an output end and being arranged in an intercommunicating series so that each of said mould cavities, except those at said ends, communicates only with the two adjacent cavities of the series, and carrying out a plurality of moulding cycles each including feeding said

material in a molten and fluid state into an accumulator chamber, reducing the volume of the accumulator chamber to displace molten and fluid material from the chamber substantially to fill the cavity at the input end of the series, maintaining said mould cavity in communication with the chamber while feeding said molten and fluid material into the latter and gradually increasing the volume of the chamber while maintaining said material in the chamber under sufficient pressure to cause said material to flow into the mould cavities of the series to take up shrinkage of said material as it solidifies in



such mould cavities, material flowing into any given cavity of the series, except the cavity at said input end, to take up shrinkage of material on solidification in said given cavity flowing into the latter via the cavity or cavities between said input end and said given cavity, disconnecting the series from the chamber at the input end of the series, providing an empty mould cavity at the input end of the series and in communication with the previously filled mould cavity at the input end of the series and bringing said empty mould cavity into communication with the chamber.

3,914,371

METHOD FOR PREPARING BORON-CARBIDE ARTICLES

Samuel T. Benton, and David R. Masters, both of Knoxville, Tenn., assignors to The United States Energy Research & Development Administration, Washington, D.C.

Filed Dec. 27, 1973, Ser. No. 428,927

Int. Cl.[2] F27B *9/04;* **C04B** *35/52;* **C01B** *31/36;* **C04B** *35/60*

U.S. Cl. 264—332 **4 Claims**

1. A method for preparing a boron-carbide article of near theoretical density in a predetermined configuration, comprising the steps of blending particulate elemental boron of an average particle size of about 0.6 micron and particulate carbon of an average particle size of about 1.0 micron in stoichiometric proportions of about 78 weight percent boron and about 22 weight percent carbon, confining the resulting blend in a mold of said configuration with surface portions thereof in contact with said blend being separate from the latter by a mold release agent substantially non-reactive with the components of the blend, heating the blend at a temperature in the range of about 1,250° to 1,500°C. to effect solid state diffusion of the boron and carbide for forming boron-carbide particles consisting of about 78 weight percent boron and about 22 weight percent carbon, increasing the temperature to a higher temperature in the range of about 1,800° to 2,200°C while maintaining the boron-carbide particles within said mold for sintering together the boron-carbide particles and applying a pressure load in the range of about 1,000 to 4,000 psi on the boron-carbide particles while at said higher temperature for increasing the density of the article to greater than 98 percent of theoretical density and maintaining said higher temperature and said pressure loading for a duration in the range of about 3 to 4 hours to form said boron-carbide article.

3,914,372

PROCESS FOR THE PREPARATION OF LABELLED COMPOUNDS

Masaru Takagi, Kamakura, Japan, assignor to Sinloihi Company Limited, Osaka, Japan

Filed Nov. 24, 1972, Ser. No. 309,030

Claims priority, application Japan, Nov. 27, 1971, 46-094895; Dec. 7, 1971, 46-098302; Oct. 2, 1972, 47-097994; Oct. 2, 1972, 47-097995; Oct. 3, 1972, 47-098616

Int. Cl. C01g *56/00*

U.S. Cl. 423—2 **10 Claims**

1. A process for the preparation of a labelled compound comprising carrying out a reaction by contacting a compound to be labelled with a gaseous radioisotope in a closed vacuum system, the system including an adsorbent, a reacting agent or a combination thereof by means of which any unreacted gaseous radioisotope may be recovered, the labelled compound being removed under vacuum from the system by melt sealing and the adsorbent, the reacting agent, its reaction product or combinations thereof being removed under vacuum from the system by melt sealing.

3,914,373

METHOD FOR SEPARATING ISOTOPES

Bernhart E. Jepson, Dayton, Ohio, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 20, 1973, Ser. No. 322,564

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C01G *57/00*

U.S. Cl. 423—2 **6 Claims**

1. A method for obtaining metal values enriched in one of the isotopes of said metal, said metal being selected from the group consisting of sodium, potassium, rubidium, cesium, magnesium, calcium, strontium, barium, lanthanum, cerium, silver, zinc, cadmium, mercury, titanium, lead and iron, comprising contacting a first aqueous phase containing a water-soluble halide of said metal with an organic phase comprising a macrocyclic polyether selected from the compounds set forth in Table I thereby forming a macrocyclic polyether complex of said metal, said complex being enriched in the lighter isotope of said metal, separating said macrocyclic polyether complex from the resulting metal depleted aqueous phase, contacting said separated complex with a second aqueous phase thereby transferring said complexed metal from said macrocyclic polyether to said second aqueous phase, and separating the resulting macrocyclic polyether from the light isotope enriched second aqueous phase.

3,914,374

REMOVAL OF RESIDUAL COPPER FROM NICKEL SOLUTIONS

Harold Koehler; Weldon P. Zundel, both of Golden, and Robert S. Rickard, Lakewood, all of Colo., assignors to AMAX Inc., New York, N.Y.

Filed Feb. 8, 1974, Ser. No. 440,688

Int. Cl.[2] C01G *3/10, 3/14*

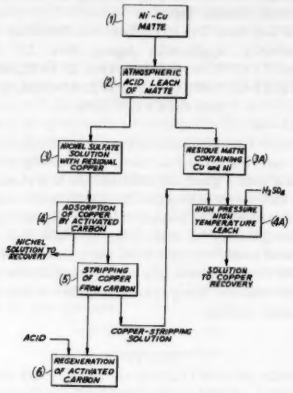
U.S. Cl. 423—25 **5 Claims**

1. A method for removing residual copper from an acid nickel sulfate leaching solution of pH of about 5 to 6.8 containing about 15 to 100 gpl nickel sulfate, up to about 5 gpl cobalt and containing about 3 to 250 ppm of copper which comprises,

providing a column of activated particulate carbon series-connected to at least one other column containing said carbon,

and then passing said solution through said series-connected

columns of activated carbon to remove substantially said copper from said solution to below 3 ppm by adsorption


(1) Ni-Cu MATTE
(2) ATMOSPHERIC ACID LEACH OF MATTE
(3) NICKEL SULFATE SOLUTION WITH RESIDUAL COPPER
RESIDUE MATTE CONTAINING Cu and Ni (3A)
(4) ADSORPTION OF COPPER BY ACTIVATED CARBON
H_2SO_4
HIGH PRESSURE HIGH TEMPERATURE LEACH (4A)
NICKEL SOLUTION TO RECOVERY
(5) STRIPPING OF COPPER FROM CARBON
SOLUTION TO COPPER RECOVERY
ACID
COPPER-STRIPPING SOLUTION
(6) REGENERATION OF ACTIVATED CARBON

in said columns at an adsorption efficiency of about 60 to 98%.

3,914,375

METHOD OF REMOVING SELENIUM FROM COPPER SOLUTION

Franklin F. Clark, Golden, and Robert S. Rickard, Lakewood, both of Colo., assignors to Amax Inc., New York, N.Y.

Filed Apr. 8, 1974, Ser. No. 459,041

Int. Cl.[2] C01G *3/00, 5/00, 7/00;* **C22B** *11/00*

U.S. Cl. 423—43 **4 Claims**

1. A method for treating a copper-containing sulfuric acid solution to produce a purified copper sulfate solution for electrowinning copper therefrom, wherein selenium contained therein is removed from solution containing iron and at least one other impurity selected from the group consisting of arsenic, antimony and bismuth precipitatable with the iron which comprises,

adjusting the pH of said acid copper solution and maintaining said solution in the acid state at a pH of at least about 3,

aerating said adjusted acid solution to precipitate said iron as $Fe(OH)_3$ and said at least one other impurity selected from said group, said selenium staying in solution,

filtering the precipitated impurities from said solution,

and then subjecting said solution to SO_2 under pressure at a temperature of about 110° C to 170° C and a pressure of about 10 to 100 psi gage to remove substantially all of said selenium from solution as Cu_2Se together with some metallic copper, thereby forming a purified copper sulfate solution, with the Cu_2Se-Cu precipitate forming a residue which is thereafter separated from the solution.

3,914,376

LAYERED RHODIUM AND NICKEL CATALYST FOR NO_X REDUCTION

George E. Barker, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Feb. 8, 1973, Ser. No. 330,531

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—213.5 **11 Claims**

1. The process of treating exhaust of combustion engines to remove nitrogen oxides therefrom which comprises contacting such exhaust at elevated temperature under reducing conditions with a catalyst comprising nickel fixed on an inert support and having alumina deposited over the nickel and rhodium dispersed upon the alumina.

3,914,377

CATALYST REACTOR FOR OXIDIZING CARBON MONOXIDE AND HYDROCARBONS IN GASEOUS STREAM

Conroy D. Anderson, Turnersville; David W. Carlson, Willingboro; Stephen M. Oleck, Moorestown, and William A. Stover, Woodbury, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed July 7, 1972, Ser. No. 269,673

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B01D *53/34*

U.S. Cl. 423—213.7 **7 Claims**

1. In a dual-bed process for reducing the amount of low molecular weight hydrocarbons and carbon monoxide in a gaseous stream, the improvement which comprises the following sequential steps:

a. passing said gaseous stream through a first catalyst bed consisting essentially of 7–20 weight percent copper oxide and 0.01–5 weight percent palladium, said copper oxide and palladium being co-impregnated from a non-acidic solution of a cuprous salt and a palladium salt upon a porous inorganic oxide support comprising at least 50 percent by weight of alumina, and thereafter

b. passing the gaseous stream from said first catalyst bed through a second catalyst bed consisting essentially of 0.01–5 weight percent palladium impregnated on a porous inorganic oxide support, whereby the low temperature conversion of said low molecular weight hydrocarbons and carbon monoxide is improved.

3,914,378

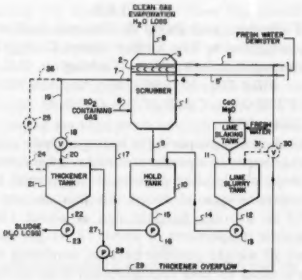
PROCESS FOR WET SCRUBBING OF SULFUR DIOXIDE FROM FLUE GAS

Joseph G. Selmeczi, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 359,777, May 14, 1973. This application Mar. 13, 1974, Ser. No. 450,752

Int. Cl.[2] C01B *17/00*

U.S. Cl. 423—242 **4 Claims**



1. In a process for removing sulfur dioxide from a gaseous stream in a wet scrubbing unit having a contact zone and means for demisting the gaseous stream wherein the gaseous stream is contacted with an aqueous liquor containing calcium salts and a magnesium ion content of about 250-5000 parts per million, and wherein a portion of the aqueous effluent is recycled to the scrubbing unit while a further portion thereof is passed to a thickener unit to precipitate salts therefrom and produce a clarified thickener overflow, the improvement comprising passing the clarified thickener overflow from the thickener unit to said means for demisting the gaseous stream, and directing said clarified thickener overflow onto said means for demisting the gaseous stream to wash the same and prevent solids buildup thereon.

3,914,379

SUBSTITUTED (NITROFURYL-ACRYLIDENE) HYDRAZINES WITH ANTIBACTERIAL PROPERTIES

Etienne Szarvasi, Charbonnieres-les-Bains, and Louis Fontaine, Lyon, both of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyon, France

Continuation-in-part of Ser. No. 215,677, Jan. 5, 1972. This application July 13, 1973, Ser. No. 379,172

Claims priority, application France, Jan. 7, 1971, 71.00283

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

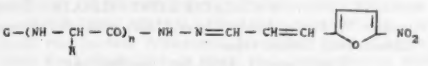
Int. Cl.[2] A61K *31/38*

U.S. Cl. 424—275 **9 Claims**

1. A pharamaceutical composition adapted for administration to obtain an antibacterial effect, comprising, per dosage unit

a pharmaceutically acceptable excipient, and

an antibacterially effective non-toxic amount of a compound of the formula

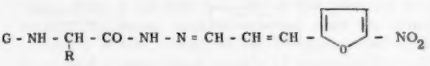


wherein *n* is 1 or 0; G is thenoyl, nitrothenoyl or carbobenzoxy; and R is H, methyl, butyl, isobutyl, δ-(2-furoyl) aminobutyl, benzyl, hydroxymethyl or p-hydroxybenzyl.

8. A pharamaceutical composition adapted for administration to obtain an antibacterial effect, comprising, per dosage unit

a pharmaceutically acceptable excipient, and

an antibacterially effective nontoxic amount of a compound of the formula



wherein

G is furoyl, thenoyl, nitrothenoyl or carbobenzoxy; and R is H, methyl, butyl, isobutyl, δ-(2-furoyl) aminobutyl, benzyl, hydroxymethyl or p-hydroxybenzyl.

3,914,380

PROCESS FOR THE PRODUCTION OF PARTICLES OF SODIUM PERBORATE MONOHYDRATE HAVING AN INCREASE RESISTANCE TO ABRASION

Helmut Dillenburg, Bad Honningen; Helmut Honig, Eurasburg uber Wolfratshausen, and Paul-Wilhelm Fuchs, Bad Honningen, all of Germany, assignors to Peroxid-Chemie GmbH, Hannover, Germany

Filed Nov. 27, 1973, Ser. No. 419,257

Claims priority, application Germany, Nov. 29, 1972, 2258319

Int. Cl.[2] C01B *15/12*

U.S. Cl. 423—279 **5 Claims**

1. In a process for the production of particles of sodium perborate monohydrate from sodium perborate tetrahydrate by continuously charging a stream of hot air through a drying chamber and into direct contact with particles of sodium perborate tetrahydrate that are disposed therein, the improvement whereby the particles are partially melted and their resistance to abrasion is improved, which process comprises maintaining the relative humidity of the hot air within the range between 40 and 80% and the temperature of the hot moist air leaving the drying chamber within the range between 60° and 90°C, the said temperture and relative humidity being maintained for a period sufficient to expel at least 0.8 molecule of water of crystallization per molecule of sodium perborate from the particles.

3,914,381

PROCESS FOR THE PREPARATION OF SUBSTANTIALLY PURE PHOSPHORUS OXYACID SALTS OF METALS OF GROUP IV 6''

Yujiro Sugahara, Tokyo; Hiroyuki Naito, Tsuruoka; Akira Takahashi, Tsuruoka, and Kiyoshi Takai, Tsuruoka, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Mar. 16, 1970, Ser. No. 19,751

Claims priority, application Japan, Mar. 18, 1969, 44-20214; Apr. 7, 1970, 45-15527

Int. Cl.[2] C01B *15/16, 25/26*

U.S. Cl. 423—305 **9 Claims**

1. A process for the preparation of substantially pure phosphorus oxyacid salts of metals of Group IV b of the Periodic Table which comprises (a) reacting a compound of a metal of Group IV b containing metallic impurities and being capable of reacting with a phosphorus oxyacid, with a phosphorus oxyacid or its reactive derivative in the presence of water at a molar ratio, expressed in terms of MO_2:P_2O_5 wherein M is the metal of Group IV b of 1:1.5 - 1:0.1; (b) separating the formed gelatinous precipitate of the phosphorus oxyacid salt of the metal of Group IV b from the mother liquor by filtration; (c) converting the obtained filter cake to a fluid sol by means of shear agitation and then scattering the sol into a heating atmosphere to form a granular gel of the phosphorus oxyacid salt of Group IV b having a water content of less than 45%, said granular gel having such a property that when it is added in an amount of 5% by weight to an aqueous solution of sulfuric acid having a concentration of 20 g/100 ml and the mixture is boiled for 10 minutes, the solubility of the Group IV b metal component is less than 0.5%; and (d) extracting said granular gel of the phosphorus oxyacid salt of the metal of Group IV b with an acid or its vapor in the presence of water to thereby remove metallic impurities therefrom.

3,914,382

PURIFICATION OF WET PROCESS PHOSPHORIC ACID USING METHYL-ISO-BUTYL KETONE

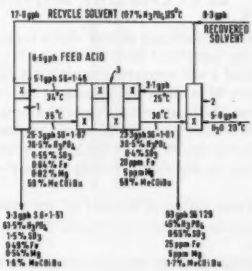
Thomas Alan Williams, Berkermot, England, assignor to Albright & Wilson Limited, Warley, England

Filed Apr. 23, 1973, Ser. No. 353,876

Claims priority, application United Kingdom, Apr. 26, 1972, 19476/72

Int. Cl.[2] B01D *11/04;* **C01B** *25/22*

U.S. Cl. 423—321 S **22 Claims**



1. A solvent extraction process for purifying impure wet process phosphoric acid obtained by action of sulphuric acid on phosphate rock comprising the following steps:

a. contacting said impure wet process phosphoric acid with methyl isobutyl ketone to form an organic phase of methyl isobutyl ketone and extracted phosphoric acid, and an aqueous phase raffinate,

said wet process phosphoric acid being an impure aqueous phosphoric acid having an acid content in the range of 70–85 percent, said acid content being the weight

percentage of phosphoric and sulphuric acids contained therein,

the weight ratio of methyl isobutyl ketone to said aqueous impure phosphoric acid being from 0.5 : 1 to 2.1;

b. separating said organic phase from said aqueous phase raffinate;

c. scrubbing said organic phase by contacting said organic phase with an aqueous phosphoric acid scrub solution,

said scrub solution containing phosphoric acid in an amount of at least 10 percent of the amount of phosphoric acid in said organic phase being scrubbed;

d. releasing the phosphoric acid from said scrubbed organic phase by contacting the scrubbed organic phase with release water in at least two counter current stages to form an aqueous phase containing purified phosphoric acid, and an organic methyl isobutyl ketone phase,

the weight ratio of said release water to said scrubbed organic phase being in the range of 0.1 : 1 to 0.3 : 1 based on the weight of said organic phase;

e. separating said aqueous phase from said methyl isobutyl ketone; and

f. recycling said methyl isobutyl ketone to step (a).

3,914,383

DY ZEOLITE HYDROCARBON CONVERSION CATALYST

Francis William Kirsch, Wayne; David S. Barmby, Media, and John D. Potts, Springfield, all of Pa., assignors to Sun Research and Development Co., Philadelphia, Pa.

Continuation-in-part of Ser. No. 581,129, Aug. 25, 1966, abandoned, and a continuation-in-part of Ser. No. 715,998, March 26, 1968, Pat. No. 3,624,173, and a continuation-in-part of Ser. No. 716,190, March 26, 1968, and a continuation-in-part of Ser. No. 749,714, Aug. 2, 1968, and a continuation-in-part of Ser. No. 823,656, May 12, 1969, and a continuation-in-part of Ser. No. 830,687, June 5, 1969, Pat. No. 3,655,813, and a continuation-in-part of Ser. No. 840,110, June 16, 1969, abandoned, and a continuation-in-part of Ser. No. 34,209, May 1, 1970, Pat. No. 3,706,814, and a continuation-in-part of Ser. No. 114,061, Feb. 9, 1971, and a continuation-in-part of Ser. No. 211,040, Dec. 22, 1971. This application Aug. 18, 1972, Ser. No. 281,910

Int. Cl. C01b *33/28*; **B01j** *11/40*

U.S. Cl. 423—328 **12 Claims**

1. A Dy alumino-silicate zeolite which is chemically characterized by the empirical formula $M_x(AlO_2)_x(SiO_2)_y(H_2O)_z$, where x, y and z are integers, the ratio x/y being from 1.0 to 0.2 and where M is chosen from one of the following groups:

a. at least one Dy^{+3} cation for every 12 atoms of aluminum in the alumino-silicate framework of said zeolite;

b. at least one cation of $Dy(OH)^{+2}$ for every eight atoms of aluminum in the alumino-silicate framework of said zoelite;

c. at least one cation of $Dy(OH)_2^{+1}$ for every four atoms of aluminum in the alumino-silicate framework of said zeolite; or

d. a combination of the members of at least two of the above groups; and wherein in said term "M", the balance of the cations, if necessary for electronic equivalency of the zeolite, comprise H^+ or cations of other metals, metal oxides or metal hydroxides and wherein there is less than one alkali metal cation for every four atoms of aluminum in the alumino-silicate portion of said zeolite and wherein said zeolite has not been contacted with steam at a temperature above 1150°F and when said zeolite is analyzed by ignition at 1800°F., at least 1.0 molecules of water is obtained for each atom of Dy in said zeolite, said zeolite being useful as a catalyst for hydrocarbon conversion reactions.

3,914,384

PRODUCTION OF MONTMORILLONITE MATERIAL HAVING GOOD ENVIRONMENTAL AND ECOLOGICAL PROPERTIES

James Thomas Gullett, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 28, 1974, Ser. No. 500,807

Int. Cl.² C01B *33/28*

U.S. Cl. 423—328 **6 Claims**

1. A process for treating montmorillonite to improve its particle size uniformity and density comprising simultaneously drying and comminuting raw, as mined, montmorillonite, having a moisture content of at least about 20% in a single pass through a suitable apparatus to a discrete particle size predominantly −200 mesh and air classifying said material to provide a Fisher Average Diameter between about 6 and 25 microns.

3,914,385

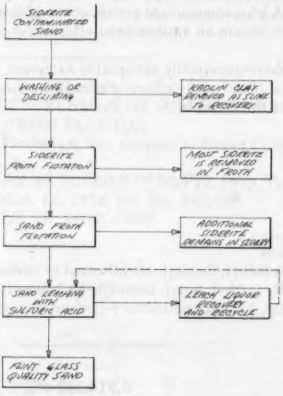
BENEFICATION OF SIDERITE CONTAMINATED SAND

Woodrow W. Slade, Walnut Creek, Calif., assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed June 11, 1973, Ser. No. 368,941

Int. Cl.² C01B *33/12*

U.S. Cl. 423—340 **8 Claims**


SIDERITE CONTAMINATED SAND
WASHING OR DESLIMING
KAOLIN CLAY REMOVED AS SLIME TO RECOVERY
SIDERITE FROM FLOTATION
MOST SIDERITE IS REMOVED IN FROTH
SAND FROM FLOTATION
ADDITIONAL SIDERITE REMAINS IN SLURRY
SAND LEACHED WITH SULFURIC ACID
LEACH LIQUOR RECOVERED AND RECYCLE
FLINT GLASS QUALITY SAND

1. In the process for producing flint quality glassmaking sand from contaminated sand containing kaolin clay and siderite, the steps of:

admixing said contaminated sand with water to form a slurry,

centrifugally separating said slurry by density differential into an overflow phase containing kaolin clay and an underflow phase containing sand and siderite,

adjusting the pH of said underflow phase with base to in the range of 8 to 10,

mixing an anionic carboxylic acid collector with said underflow phase to form first a froth flotation mixture,

aerating said first froth flotation mixture to float a portion of said siderite in the resulting froth,

removing said froth to leave a sand-containing slurry,

mixing a cationic amine collector with said sand-containing slurry to form a second froth flotation mixture,

aerating said second froth flotation mixture to float sand in the resulting froth, and leave residual siderite in the slurry,

removing sand from said froth,

leaching said sand with aqueous sulfuric acid at a temperature and for a time sufficient to reduce the iron oxide content thereof to less than about 0.025% as Fe_2O_3, and filtering the aqueous sulfuric acid leach liquor from the sand and drying the sand.

3,914,386

REDUCTION OF FOAMING IN AMMONIA RECOVERY SYSTEM OF A HCN MANUFACTURING PROCESS

Thomas Jon Anderson, Victoria, Tex., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 30, 1974, Ser. No. 493,095
Int. Cl.² B01D *53/34*; C01C *3/02*
U.S. Cl. 423—376 4 Claims

1. In the process of preparing hydrogen cyanide from the reaction of methane, ammonia and air over a platinum catalyst wherein the reaction product thereof is contacted with an ammonium phosphate solution and said phosphate solution is stripped of hydrogen cyanide and ammonia and then recycled, the improvement comprising contacting the phosphate solution with activated carbon at a carbon-to-phosphate solution weight ratio of 1:4000 or greater for a period and separating the solution from the activated carbon.

3,914,387

METHOD OF REMOVING SULFUR DIOXIDE FROM A DUST CONTAINING EXHAUST GAS STREAM

Wenzel von Jordan, Wixhausen; Hans-Jörg Barth, Langen; Hans Koch, Frankfurt am Main, and Günter Boning, Bergen-Enkheim, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jan. 14, 1974, Ser. No. 433,357
Claims priority, application Germany, Jan. 31, 1973, 2304496
Int. Cl.² C01B *17/00*
U.S. Cl. 423—242 6 Claims

1. A process for removing sulfur dioxide from a dust-containing gas stream comprising the steps of:

a. scrubbing said dust-containing gas stream with an aqueous solution of sodium hydroxide and sodium sulfate drawn from a solution reservoir in the presence of a catalyst containing material selected from the group consisting of iron, cobalt, nickel, manganese and vanadium, said catalyst being capable of promoting the substantially complete coversion of the sulfur dioxide of said gas stream with the sodium hydroxide of said solution into sodium sulfate;

b. continuously withdrawing the solution laden with sodium sulfate from step (a), measuring its pH value and feeding it to a settling zone and producing a supernatant liquid therein;

c. feeding a first partial stream of supernatant liquid from said settling zone to said solution reservoir;

d. feeding a second partial stream of said supernatant liquid from said settling zone to a precipitation zone and mixing said second partial stream with calcium hydroxide to precipitate calcium sulfate therefrom and form a second supernatant liquid containing sodium hydroxide, and withdrawing calcium sulfate from said precipitation zone;

e. feeding said second supernatant liquid from said precipitation zone to said solution reservoir and adjusting the amount of said second supernatant liquid to keep the pH value of the laden solution of step (b) in the range of 6.5 to 7.

3,914,388

VOLATILIZATION OF IODINE FROM NITRIC ACID USING PEROXIDE

George I. Cathers, and Calvin J. Shipman, both of Knoxville, Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 11, 1973, Ser. No. 396,336
Int. Cl.² C01F *13/00*
U.S. Cl. 423—249 7 Claims

1. In a process wherein neutron irradiated substances are dissolved in nitric acid to form a solution and said solution includes radioactive iodine as a solute therein, and wherein said iodine is removed from said solution, the improvement comprising removing residual iodine from said solution by:

boiling said solution;

adding hydrogen peroxide to said boiling solution to cause the formation of volatile hydrogen iodide and the vaporization of said hydrogen iodide; and

collecting iodine from said hydrogen iodide.

3,914,389

LANTHANUM OXIDATION CATALYST AND METHOD FOR UTILIZING THE SAME

Gottfried C. Haacke, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 22, 1974, Ser. No. 453,619
Int. Cl.² C01F *17/00*; C01G *45/00*
U.S. Cl. 423—263 4 Claims

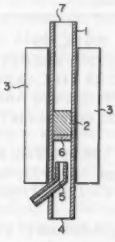
1. A process for the preparation of a lanthanum compound of the structure: $La\,Cu_{.5}\,Mn_{.5}\,O_3$ which consists in the steps of: dissolving in an aqueous medium to form a solution therein a copper salt, a lanthanum salt, and a manganese salt in an equivalent amount to provide the compound, $La\,Cu_{.5}\,Mn_{.5}\,O_3$, introducing the said solution into a container filled with liquid nitrogen, evaporating the nitrogen content therein, distilling under vacuum resultant residue to remove water therein, heating the residual salts so recovered at a temperature between about 225°C. and 275°C., continuing heating said salts for 72 hours at 650°C. in the presence of oxygen, and recovering the said lanthanum copper manganese oxide compound, $La\,Cu_{.5}\,Mn_{.5}\,O_3$, therefrom.

3,914,390

METHOD FOR REDUCING NITROGEN OXIDES

Tetsuichi Kudo, Tokyo; Toshikatsu Manabe, Ome; Kazuetsu Yoshida, Kokubunji; Tetsuo Gejyo, Tokyo, and Michiharu Seki, Fuchu, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 18, 1973, Ser. No. 398,449
Claims priority, application Japan, Sept. 20, 1972, 47-93594
Int. Cl.² C01B *21/00*; B01D *53/34*
U.S. Cl. 423—351 23 Claims



1. A process for reducing nitrogen oxides, which comprises contacting a catalyst comprising a porous ceramic carrier, and 0.1 to 10 % by weight of copper oxide in terms of copper metal, 0.1 to 20 % by weight of lanthanum oxide in terms of lanthanum metal, and 0.01 to 12 % by weight of zirconium oxide in terms of zirconium metal, based on the weight of the carrier, the metal oxides being held on the carrier, with a gas containing a nitrogen oxide in the presence of ammonia and a sulfur oxide in a temperature range of 250° to 500°C, thereby reducing said nitrogen oxide.

3,914,391
PREPARATION OF $HPd(CN)_3$

Kenzie Nozaki, St. Louis, Mo., assignor to Shell Oil Company, Houston, Tex.

Filed Mar. 26, 1973, Ser. No. 344,680
Int. Cl.² C01C *3/00*
U.S. Cl. 423—364 **7 Claims**

1. $HPd(CN)_3$.

2. A process for preparing $HPd(CN)_3$ which comprises:

1. contacting $Pd(CN)_2$ with an aqueous solution of HCN in stoichiometric excess at a temperature from about 0°C to 100°C.
2. evaporating the resulting reaction mixture to dryness under reduced pressure at a temperature of from about 0°C to 40°C, and
3. recovering the resulting white, water-soluble residue.

3,914,392
HIGH TEMPERATURE INSULATING CARBONACEOUS MATERIAL

Robert D. Klett, Albuquerque, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 27, 1973, Ser. No. 345,422
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² C01B *31/02, 31/04*
U.S. Cl. 423—445 **9 Claims**

1. A process for manufacturing thermal insulating carbonaceous material for use at temperatures in excess of 2000°C comprising; comminuting natural tetrakaidecahedronal cell structure cork to from about 150 microns to about 2000 microns diameter granules, confining said granules, heating said granules while so confined to interbind and cure said granules into a shaped form, heating said shaped form to a temperature of from about 900°C to about 1200°C in from about 30 to about 100 hours to carbonize said shaped form to a high temperature insulative material, and holding at said temperature for a period of from about 1 to about 5 hours.

8. A thermal insulating carbonaceous form for use at temperatures in excess of 2000°C consisting essentially of carbonized cork havng tetrakaidecahedronal cells structure, density of from about 5 to about 30 pounds per cubic foot, and cell diameters of about 0.007 inch produced by the process of claim 1.

3,914,393
PROCESS FOR THE CONVERSION OF STABILIZED ACRYLIC FIBERS TO CARBON FIBERS

Michael J. Ram, West Orange, and Andrew H. Di Edwardo, Parsippany, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 228,959, Feb. 24, 1972, abandoned. This application Sept. 26, 1973, Ser. No. 400,829
Int. Cl. C01b *31/07*
U.S. Cl. 423—447 **16 Claims**

1. In a process for the production of a carbonaceous fibrous material wherein a stabilized acrylic fibrous material derived from an acrylonitrile homopolymer or an acrylonitrile copolymer containing at least about 85 mol percent of acrylonitrile units and up to about 15 mol percent of one or more monovinyl units copolymerized therewith is positioned in a heating zone containing an inert gaseous atmosphere at a temperature in excess of 300°C. to form a carbonaceous fibrous material containing at least about 90 percent carbon by weight with the simultaneous evolution of hydrogen cyanide gas from said fibrous material; the improvement comprising:

a. withdrawing a gaseous mixture of said inert gas and hydrogen cyanide gas evolved during said heating from said heating zone, and

b. contacting via countercurrent flow said gaseous mixture following withdrawal from said heating zone with an aqueous solution of cupric sulfate wherein said hydrogen cyanide undergoes reaction with said cupric sulfate to form an insoluble precipitate.

3,914,394
PROCESS FOR PRODUCING CARBON FIBERS

Keitaro Fukushima; Soichiro Kishimoto, and Yoshinori Nosaka, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Jan. 31, 1974, Ser. No. 438,351
Claims priority, application Japan, Feb. 15, 1973, 48-18620; July 11, 1973, 48-78202
Int. Cl.² C01B *31/07*
U.S. Cl. 423—447 **15 Claims**

1. A process for producing carbon fibers which comprises (a) preoxidizing an acrylonitrile fiber at a temperature of 180° to 400°C. in an oxidizing atmosphere, (b) applying ultrasonic waves having a frequency of not more than 200 KHz to the preoxidized fiber in a liquid medium and (c) thereafter carbonizing the preoxidized fiber in a non-oxidizing atmosphere at a temperature above 800°C.

3,914,395
PROCESS FOR THE MANUFACTURE OF HIGH STRENGTH CARBON/CARBON GRAPHITIC COMPOSITES

Thomas M. Finelli, North Andover; Edward Lenoe, Andover, and Lawrence E. McAllister, Chelmsford, all of Mass., assignors to Avco Corporation, Cincinnati, Ohio

Continuation-in-part of Ser. No. 240,792, April 3, 1972, abandoned. This application Jan. 14, 1974, Ser. No. 433,057
Int. Cl.² C01B *31/04, 31/07*
U.S. Cl. 423—448 **4 Claims**

1. A process for forming high-quality graphitic carbon/carbon composites which comprises slowly heating a shaped composite of low-modulus amorphous carbon fibers impregnated with a carbonizable binder to a temperature at which the binder is carbonized, then holding the composite at about that temperature until stabilized, thereafter subjecting the composite to slowly increasing temperatures up to about 2,700°C, and holding at about that temperature until the mass is stabilized and slowly cooling the now graphitized composite, repeating said heating, graphitizing and cooling cycle at least one additional time until the resulting composite has a density of 1.5 or greater, a flexural strength of 30,000 psi or greater, and a flexural modulus of 25×10^6 psi or greater.

3,914,396
METHOD FOR OBTAINING TITANIUM DIOXIDE HAVING A CONTROLLED PARTICLE SIZE

Gianfranco Bedetti, Milan; Giovanni Pieri; Aldo Ducato, both of Novara, all of Italy, and Llewellyn John Held, Palmerton, Pa., assignors to Montecatini Edison S.p.A., Milan, Italy and The New Jersey Zinc Company, Bethlehem, Pa.

Filed Dec. 4, 1972, Ser. No. 312,123
Claims priority, application Italy, Dec. 10, 1971, 32207/71The portion of the term of this patent subsequent to Apr. 3, 1990, has been disclaimed.
Int. Cl.² C01G *23/04*
U.S. Cl. 423—613 **3 Claims**

1. In a process for producing pigment quality titanium dioxide of controlled particle size by reacting gaseous titanium tetrachloride with an oxygen containing gas, the improvement comprising:

a. preheating said oxygen containing gas to a temperature of about 1700°C to 2300°C and imparting to the preheated gas a helical motion characterized by a swirl number between about 0.2 and 20 and feeding said swirling gas to the top end of a reactor comprising an upper cylindrical duct, a lower cylindrical reaction chamber coaxial with said cylindrical duct and having a longer diameter than said cylindrical duct, and downwardly divergent

frusto-conical duct connecting the lower end of said cylindrical duct to the upper end of said cylindrical reaction chamber, said frusto-conical duct diverging from the vertical at an angle of from about 5° to 30° and having a vertical extent of from about 0.5 to 10 times the diameter of said reaction chamber;

b. selecting the vertical location for an annular slot in said frusto-conical duct at a location such that the ratio of the diameter of said annular slot to the diameter of said reaction chamber is less than 1.0 and not less than .2, said slot having a thickness of between about .01 and .1 times the diameter of the reaction chamber and being inclined to the reactor axis at an angle of between about 0° and 45°; and

c. heating the titanium tetrachloride to about 400° to 600°C and feeding said titanium tetrachloride through said annular slot into said frusto-conical duct.

3,914,397

PRODUCTION OF CHLORINE MONOXIDE GAS

Walter A. Mueller, Dorval, Canada, assignor to Pulp and Paper Research Institute of Canada, Pointe Claire, Canada

Continuation-in-part of Ser. No. 168,030, Aug. 2, 1971, abandoned. This application Dec. 14, 1973, Ser. No. 424,653

Claims priority, application United Kingdom, Aug. 5, 1970, 37803/70

Int. Cl.² C01B *11/02*

U.S. Cl. 423—462 **9 Claims**

1. A process for directly preparing a chlorine monoxide in high yields in which the molar ratio of chlorine monoxide is not less than about 80% which comprises the combination of: reacting (A) a solid compound selected from the group consisting of the carbonates and bicarbonates of the alkali metals, such solids being in a dry, highly reactive, porous, open-structure form having a surface area within the range of about 0.3 to about 5.2 m^2/g and a specific gravity (weight per volume of powder) of about 1.06 to about 0.635 g/cm^3,

with (B) close to but not substantially more than a stoichiometric amount of chlorine gas in the form of a mixture of dry gaseous chlorine and moist diluent gas consisting essentially of air, oxygen and nitrogen, and mixtures thereof, the amount of said diluent being sufficient to provide a *v/v* ratio of diluent/Cl_2O of at least 77/23

at (C) a temperature of about −20 °C. to about +30°C.,

while (D) monitoring the pH to remain at 9.5 or higher, the pH being measured by withdrawing solid reactant product, dissolving it in water, and measuring the pH of the resulting aqueous solution.

3,914,398

PROCESS FOR MAKING ANHYDROUS HYDROGEN FLUORIDE FROM FLUOSILICIC ACID

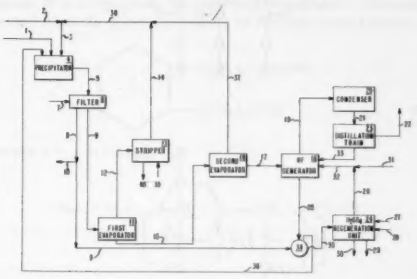
Carl Raymond Faust, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Dec. 16, 1974, Ser. No. 534,093

Int. Cl.² C01B *7/22*

U.S. Cl. 423—483 **10 Claims**

1. A process for producing anhydrous hydrogen fluoride from fluosilicic acid comprising the steps of (1) contacting an aqueous solution of fluosilicic acid with ammonia to produce an aqueous solution of ammonium fluoride and recovering said ammonium fluoride solution, said ammonia being present in excess of the amount required to react with all of said fluosilicic acid; (2) heating said ammonium fluoride solution to remove ammonia and water and to produce liquid ammonium bifluoride; (3) contacting said ammonium bifluoride with sulfuric acid to produce ammonium bisulfate and hydrogen fluoride and recovering ammonium bisulfate and anhydrous hydrogen fluoride; (4) burning the ammonium bisulfate at a temperature of from about 850° to 1200°C. to produce a gaseous mixture containing sulfur dioxide; 5) contacting the sulfur dioxide with oxygen in the presence of a catalyst to form sulfur trioxide; (6) contacting the sulfur trioxide with water to



produce sulfuric acid; and (7) recycling said sulfuric acid to step (3).

3,914,399

ELEMENTAL SULFUR PRODUCED BY WET OXIDATION OF HYDROGEN SULFIDE

Phillip M. Beazley, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Dec. 26, 1973, Ser. No. 428,585

Int. Cl.² C01B *17/04*

U.S. Cl. 423—573 **6 Claims**

1. A process for converting hydrogen sulfide to elemental sulfur comprising forming a mixture of consisting essentially of alcohol, aliphatic amine, and catechol contacting said mixture with H_2S and with oxygen-containing gas and recovering the monoclinic elemental sulfur thus formed wherein from about 1 to about 100 moles of amine are present per mole of catechol.

3,914,400

STABLE ANTIGEN-ERYTHROCYTES FOR MEASURING ANTIBODIES AGAINST TOXOPLASMA ORGANISM

N. Raphael Shulman, Kensington, and Cecil R. Coleman, Silver Spring, both of Md., assignors to The Government of the United States, Washington, D.C.

Filed May 21, 1973, Ser. No. 362,308

Int. Cl.² C12K *1/00;* **G01N** *31/02, 33/16*

U.S. Cl. 424—12 **5 Claims**

1. In the method of bonding a pyruvic aldehyde stabilized human erythrocyte to a protein antigen, the improvement comprising contacting a suspension of said cells with said antigen while stirring for a period between 2 hours at room temperature and 10 minutes at 50°C, and wherein the protein concentration of antigen in the cell suspension is in the range of 0.5 to 2 units of density at 280 mμ wavelength and a 1 cm lightpath, said antigen being the toxoplasmosis antigen, said cells being type **0** negative human erythrocytes.

3,914,401

ENTERIC COMPOSITIONS

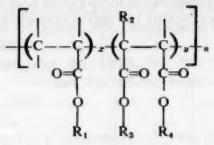
Moustafa M. Sharabash, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 188,591, Oct. 12, 1971. This application Mar. 20, 1974, Ser. No. 452,888

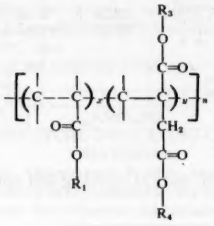
Int. Cl.² A61K *27/00*

U.S. Cl. 424—19 **12 Claims**

1. An enteric medicament comprising a drug protected from the gastric environment by a coating comprised of a partial alkylene glycol ether ester of a C_1-C_4 alkyl acrylate-unsaturated polybasic carboxylic acid anhydride copolymer selected from the group having as a general formula either



or

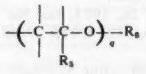


wherein

R_1 is C_1-C_4 alkyl;

R_2 is hydrogen or methyl;

R_3 and R_4 are hydrogen or the moiety



wherein

R_5 is hydrogen or methyl, and R_6 is C_1-C_4 alkyl;

with the proviso that from about 10 to about 50 percent of the total potential of R_3 and R_4 is other than hydrogen;

n is above 70;

q is a whole number from 1 to 4; and

x and *y* are whole numbers from 1 to 5.

3,914,402

OPHTHALMIC DOSAGE FORM, FOR RELEASING MEDICATION OVER TIME

John W. Shell, Los Altos, Calif., assignor to ALZA Corporation, Palo Alto, Calif.

Filed June 14, 1973, Ser. No. 369,916

Int. Cl.[2] A61K *27/12*

U.S. Cl. 424—32 **4 Claims**

1. An ophthalmic dosage form comprising substantially dry solid particles of ophthalmic drug enclosed within a bioerodible release rate controlling material formed of a hydrophobic poly(carboxylic acid) having a molecular weight of about 10,000 to about 800,000 and containing 8 to 22 carbon atoms for each carboxylic hydrogen with the particles consisting of about 8 parts drug up to 1 part material to about 1 part drug up to about 3 parts material, said particles being from 10 to 300 microns in largest dimensions and forming a suspension of 1 part up to 50 parts when admixed prior to administration with up to 100 parts of an ophthalmically acceptable isotonic aqueous carrier having a pH acceptable to the eye, with drug released in the eye as the particles erode in response to the ocular environment in a controlled and continuous rate over a prolonged period of time.

3,914,403

HAIR CARE PREPARATIONS CONTAINING N-VINYL PYRROLIDONE HOMO- AND COPOLYMERS AND A QUATERNIZED COPOLYMER OF VINYL PYRROLIDONE

Kent John Valan, Totowa Borough, N.J., assignor to GAF Corporation, New York, N.Y.

Filed May 11, 1973, Ser. No. 359,325

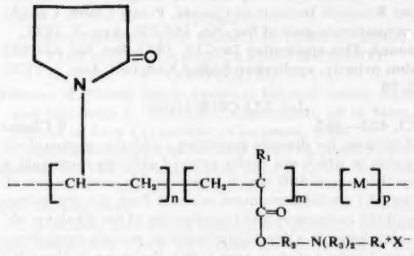
Int. Cl.[2] H61K *7/11*

U.S. Cl. 424—47 **17 Claims**

1. A hair care composition comprising a solvent selected from the group consisting of water, a C_{2-3} monohydric aliphatic alcohol and mixtures of each of these, said solvent containing a polymeric component approximately 0.1 to about 45 percent by weight of said composition, said polymeric component consisting essentially of.

1. 90 to 10 percent of a homopolymer of N-vinyl pyrrolidone or a copolymer thereof with up to about 90 percent vinyl acetate based on the weight of said copolymer; and

2. 10 to 90 percent of a quaternized copolymer having the following formula:



wherein n represents 40-90 percent, m is 5–40 mole percent, p is 0–50 mole percent, and n+m+p = 100; R_1 is H or Ch_3; R_2 is CH_2, Ch_2CH_2, or C_xH_{2x} where x = 2–18; R_3 is CH_3 or C_2H_5; R_4 is CH_3, C_2H_5, or

X is Cl, Br, I, SO_4, or CH_3OSO_3; and M is a vinyl monomeric unit having no hydroxyl groups and different from and copolymerizable with the *n* and *m* units.

7. An aerosol hair spray containing a pressurizing amount of an aerosol propellant and the composition as defined in claim **1**.

3,914,404

DENTIFRICES AND METHOD FOR REDUCING ENAMEL SOLUBILITY

Horst G. Langer, Wayland, Mass., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 790,469, Jan. 10, 1969, abandoned, which is a continuation-in-part of Ser. No. 714,411, March 20, 1968, abandoned, which is a continuation-in-part of Ser. No. 359,778, April 14, 1964, abandoned, which is a continuation of Ser. Nos. 43, Jan. 4, 1960, abandoned, and Ser. No. 165,962, Jan. 12, 1962, abandoned. This application Apr. 16, 1970, Ser. No. 29,281

Int. Cl.[2] A61K *9/68, 7/22*

U.S. Cl. 424—48 **4 Claims**

1. A dentifrice containing from about 0.00001 to 15 percent by weight of the distannous chelate of ethylenediamenetetraacetic acid.

3,914,405
COSMETIC AND TOOTHPASTE PREPARATIONS

Thomas H. Shepherd, Hopewell, and Francis E. Gould, Princeton, both of N.J., assignors to National Patent Development Corporation, New York, N.Y.

Continuation of Ser. No. 192,658, Oct. 26, 1971, abandoned, which is a continuation-in-part of Ser. No. 567,856, July 26, 1966, Pat. No. 3,520,949, Continuation-in-part of Ser. No. 650,259, June 30, 1967, abandoned, which is a continuation-n-part of Ser. No. 654,044, July 5, 1967, abandoned, which is a continuation-in-part of Ser. No. 743,626, July 10, 1968, Pat. No. 3,574,822. This application May 21, 1973, Ser. No. 361,932

Int. Cl.[2] A61K 7/16

U.S. Cl. 424—49 8 Claims

1. In a toothpaste containing a flavoring agent the improvement comprising including in said toothpaste a hydrophilic polymer of an acrylate or methacrylate selected from the group consisting of hydrophilic polymers of hydroxy lower alkyl acrylates, hydroxy lower alkyl methacrylates, hydroxy lower alkoxy lower alkyl acrylates and hydroxy lower alkoxy lower alkyl methacrylates, said flavoring agent being contained in said polymer and being releasable upon contact with an aqueous medium.

3,914,406
COMPOSITIONS AND METHOD FOR PREVENTION AND TREATMENT OF GINGIVITIS

Samuel L. Yankell, Moorestown, N.J., assignor to Menley & James Laboratories, Ltd., Philadelphia, Pa.

Filed Dec. 28, 1973, Ser. No. 429,433

Int. Cl.[2] A61K 7/18

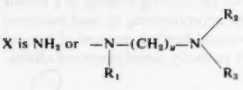
U.S. Cl. 424—52 10 Claims

1. The method of treating gingivitis which comprises administering to the oral cavity of an animal organism suffering from gingivitis a nontoxic amount sufficient to treat said gingivitis of a dentifrice composition comprising an amine hydrofluoride or combinations thereof having the formula:

RXHF

in which:

R is alkyl or alkenyl having from about 10 to about 24 carbon atoms;



in which y is an integer of from 1 to 3 and R_1, R_2 and R_3 represents hydrogen, lower alkyl, lower alkenyl or lower alkanol having up to five carbon atoms.

3,914,407
NON-IONIC SURFACE ACTIVE AGENTS AS COSMETIC EMULSIFIERS

Gregoire Kalopissis, Paris, and Guy Vanlerberghe, Montjay-la-Tour, both of France, assignors to Societe Anonyme Dite: L'Oreal, Paris, France

Division of Ser. No. 119,363, Feb. 26, 1971, Pat. No. 3,824,294, which is a continuation-in-part of Ser. No. 780,299, Nov. 29, 1968, abandoned, which is a continuation-in-part of Ser. No. 677,047, Oct. 23, 1967, Pat. No. 3,595,924. This application June 17, 1974, Ser. No. 480,671

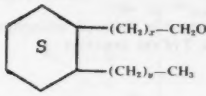
Claims priority, application France, Oct. 21, 1966, 66.52227; Oct. 24, 1966, 66.52228; Oct. 6, 1967, 67.54662; Dec. 1, 1967, 67.130712

Int. Cl.[2] A61K 7/021, 7/035, 9/10

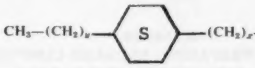
U.S. Cl. 424—63 7 Claims

7. A cosmetic composition comprising a powdered pigment selected from the group consisting of iron oxide, titanium oxide and barium sulfate and as a peptizing agent a compound having the formula

wherein R is a lipophilic hydrocarbon residue of a member selected from the group consisting of hydrogenated lanolin,



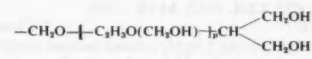
wherein $x + y = 10$ and



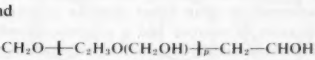
wherein $x + y = 12$,

R′ is selected from the group consisting of methyl and ethyl,

X is selected from the group consisting of $-CH_2OH$,



and



m has a statistical average value between 1–10 inclusive,

n has a statistical average value between 1–5 inclusive,

p is an integer between 0–10 inclusive and the product *n* (*p*+2) lies between 2–12 inclusive, said compound being present in an amount sufficient to peptize said pigment in said composition.

3,914,408
VACCINE FOR NEONATAL CALF DIARRHEA

Charles A. Mebus, Lincoln, Nebr., assignor to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Division of Ser. No. 405,997, Oct. 12, 1973, Pat. No. 3,873,422, which is a continuation-in-part of Ser. No. 302,179, Oct. 30, 1972, abandoned. This application Nov. 29, 1974, Ser. No. 528,126

Int. Cl.[2] C12K 5/00

U.S. Cl. 424—89 7 Claims

1. A combination parental calf diarrhea vaccine comprising an immunizing-effective amount of an inactivated bovine cell culture propagated coronavirus-like calf diarrhea virus and an immunizing-effective amount of an inactivated bovine cell culture propagated reovirus-like calf diarrhea virus.

3,914,409
AMPHOTERICIN B DERIVATIVES

William James McGahren, Demarest, N.J., and Martin Paul Kunstmann, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 23, 1974, Ser. No. 436,007

Int. Cl.[2] A61K 35/00

U.S. Cl. 424—119 1 Claim

1. A neutral derivative of Amphotericin B, a compound which

a. is water soluble to the extent of 25–30 mg./ml. and is effective in inhibiting the growth of fungi; and in its essentially pure amorphous form

b. has an optical rotation $[\alpha]_D^{25°} = +225° - +240°$ (in dimethylsulfoxide);

c. has the following elemental analysis (percent): C, 56.71; H, 7.62; N, 1.46;

d. has the following ratio of extinction coefficients in the ultraviolet:

$$\frac{E_{1cm.}^{1\%} \text{ at } 385 \text{ m}\mu}{E_{1cm.}^{1\%} \text{ at } 407} = 0.910\text{–}0.950; \text{ and}$$

e. has a characteristic infrared absorption spectrum as shown in FIG. 2 of the drawings.

3,914,410

METHOD FOR PREPARING SUCROSE COMPOSITION CONTAINING CHROMIUM III SALT

John Carl Godfrey, Syracuse, N.Y., assignor to Bristol-Myers Company, New York, N.Y.

Filed June 13, 1972, Ser. No. 262,378

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] A23L *1/30;* **A61K** *33/00*

U.S. Cl. 424—131 **7 Claims**

1. In a method of preparing a highly refined sucrose composition having the property of reducing the severity or incidence of atherosclerosis or adult onset diabetes consisting essentially of a mixture of sucrose and a pharmaceutically acceptable salt of a chromium III ion, the steps comprising:

A. mixing a higly refined sucrose in powdered form with a pharmaceutically acceptable salt of a chromium III ion, said salt being incorporated in said mixture in an amount sufficient to provide a concentration of said salt of 500 ppm per gram, basis the weight of said sucrose,

B. grindng said mixture unitl a uniform mixture of said highly refined sucrose and said salt of a chromium III ion is produced to provide a concentrate,

C. adding said concentrate to a powdered highly refined sucrose to form a mixture thereof, said concentrate being added in an amount sufficient to provide a concentration of said salt of a chromium III ion in said last named mixture in the range of from 0.5 to 5.0 ppm per gram, basis the total weight of said highly refined sucrose in said composition.

3,914,411

BACTERICIDAL SOLUTIONS CONTAINING IODINE AND A CONDENSATION PRODUCT OF PROPYLENE OXIDE AND A TRIALKANALAMINE

Alexandre Askienazy, and Georges Melki, both of Paris, France, assignors to Compagnie Francaise de Produits Industriels, Asnieres, France

Filed Feb. 29, 1972, Ser. No. 230,474

Claims priority, application France, Mar. 3, 1971, 71.07364

Int. Cl.[2] A01N *11/00*

U.S. Cl. 424—150 **7 Claims**

1. A bactericidal solution, comprising:

A. iodine and a condensation product of 3 to 30 moles of propylene oxide with one mole of triisopropanolamine, said condensation product having about 40% of iodine fixed thereto, at least about 80% of the fixed iodine being titratable with thiosulfate;

B. a hydrotropic agent in an amount sufficient to solubilize said condensation product and fixed iodine selected from the group consisting of anionic, non-ionic, cationic and amphoteric surface active agents; and

C. water in an amount of 60 to 90% of said bactericidal solution.

3,914,412

[DES—GLY] 10 -GN—RH NONAPEPTIDE AMIDE ANALOGS IN POSITION 6 HAVING OVULATION-INDUCING ACTIVITY

Ronald Lee Gendrich, Waukegan; Riemond Henry Rippel, Gurnee, and John Hunter Seely, Lake Bluff, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Oct. 11, 1973, Ser. No. 405,334

Int. Cl.[2] A61K *37/00;* **C07C** *103/52*

U.S. Cl. 424—177 **3 Claims**

1. The process of inducing ovulation in a warm-blooded animal possessing a suitably mature follicle comprising administering to said animal a dose sufficient to induce ovulation of compound of claims the formula:

$$pGlu-His-Trp-Ser-Tyr-X-Leu-Arg-Pro-NHC_2H_5$$

wherein all aminoacids are present in their optical L-configuration and wherein X represents an aminoacid in the D-configuration and having the formula:

$$-NH-\underset{\displaystyle R}{\underset{|}{CH}}-CO-$$

wherein R is a linear or branched hydrocarbon chain of 1 – 4 carbon atoms.

3,914,413

PROCESS FOR FACILITATING WOUND HEALING WITH N-ACETYLATED PARTIALLY DEPOLYMERIZED CHITIN MATERIALS

Leslie L. Balassa, Tomahawk Lake, Blooming Grove, N.Y. 10914

Continuation of Ser. No. 114,350, Feb. 10, 1971, abandoned, which is a division of Ser. No. 704,538, Feb. 12, 1968, and a continuation-in-part of Ser. No. 619,007, Feb. 27, 1967, abandoned. This application July 9, 1973, Ser. No. 377,505The portion of the term of this patent subsequent to Jan. 4, 1989, has been disclaimed.

Int. Cl.[2] A61K *31/70, 9/70, 35/12*

U.S. Cl. 424—180 **11 Claims**

1. A process for facilitating healing of a wound in a mammal which comprises administering to said mammal a therapeutically effective wound healing amount of a material cmprising an N-acetylated partially depolymerized chitin.

3,914,414

METHOD OF INCREASING CORONARY PO_2 IN MAMMALS

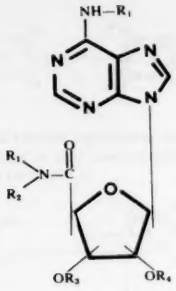
Herman Hal Stein, Skokie, Ill., and Raj Nandan Prasad, Pierrefonds, Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 370,084, June 14, 1973, Pat. No. 3,864,483, which is a division of Ser. No. 236,980, March 22, 1972, which is a continuation-in-part of Ser. No. 125,893, March 18, 1971, abandoned. This application July 30, 1974, Ser. No. 492,949

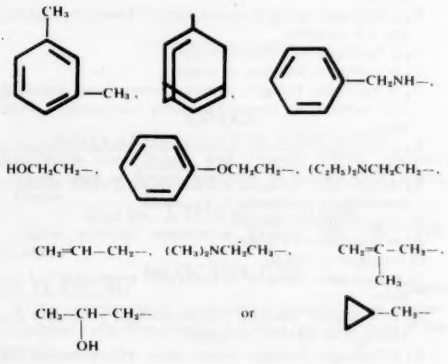
Int. Cl.[2] A61K *27/12*

U.S. Cl. 424—180 **1 Claim**

1. A method of increasing coronary pO_2 in a mammal in need of such treatment comprising administering to said mammal a therapeutically effective amount of a compound of the formula



wherein R_1 is Hydrogen or $CH_2{=}CH\text{-}CH_2$; R_2 is



R_3 and R_4 are hydrogen.

The following compounds are prepared according to the method of Example 4, substituting the appropriate amine for diethylamine.

3,914,415

ADENOSINE-5'-CARBOXYLIC ACID AMIDES

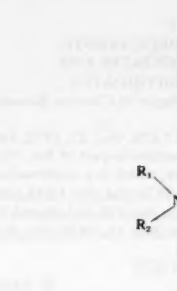
Herman Hal Stein, Skokie, Ill., and Raj Nandan Prasad, Pierrefonds, Canada, assignors to Abbott Laboratories, North Chicago, Ill.

Division of Ser. No. 370,084, June 14, 1973, Pat. No. 3,864,483, which is a division of Ser. No. 236,980, March 22, 1972, which is a continuation-in-part of Ser. No. 125,893, March 18, 1971, abandoned. This application July 30, 1974, Ser. No. 492,950

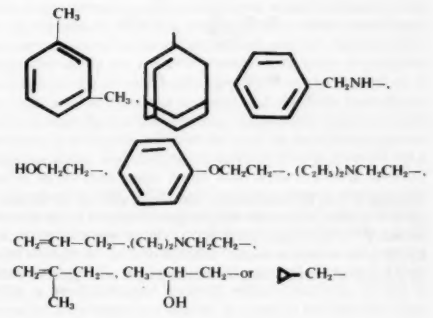
Int. Cl.[2] A61K *27/12*

U.S. Cl. 424—180 **1 Claim**

1. A method of lowering blood pressure in a hypertensive mammal comprising administering to said mammal a therapeutically effective amount of a compound of the formula



wherein R_1 is Hydrogen or $CH_2{=}CH{-}CH_2$; R_2 is



R_3 and R_4 are hydrogen.

3,914,416

CERTAIN MONOMETHYL TRISILANOL MANNURONATE COMPLEXES FOR TREATING CELLULITIS

Charles Henri Jean Gueyne, Cauderan, and Marie Irene Duffaut nee Paumont, Barsac, both of France, assignors to Societe Anonyme Exsymol, Monaco

Continuation-in-part of Ser. No. 692,303, Dec. 21, 1967, abandoned. This application May 1, 1970, Ser. No. 33,947

Claims priority, application France, Dec. 23, 1966, 66.88728

Int. Cl.[2] A61K *31/695*

U.S. Cl. 424—184 **5 Claims**

1. A therapeutically-acceptable aqueous composition containing from 0.01 to at most 5 percent by weight of monomethyltrisilanol mannuronate complex of the formula

$$[H_3C{-}Si(OMe)_3]_a.[YMe]_b.cH_2O$$

wherein each of a and b is a positive whole number,

c is 0 or a positive whole number,

each Me is either hydrogen or an alkali metal, and

Y is the anion of mannuronic acid,

capable of forming a stable aqueous solution over virtually the entire range between pH 1 and pH 8.

3,914,417
INSECTIDICAL N-HYDROCARBOYL PHOSPHOROAMIDOTHIOATES AND PHOSPHOROAMIDODITHIOATES

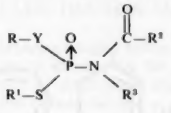
Philip S. Magee, Ignacio, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 317,478, Dec. 21, 1972, Pat. No. 3,845,172, which is a continuation-in-part of Ser. No. 148,139, May 28, 1971, abandoned, which is a continuation-n-part of Ser. No. 13,846, Feb. 24, 1970, Pat. No. 3,716,600, which is a continuation-in-part of Ser. No. 810,383, March 25, 1969, abandoned. This application July 11, 1974, Ser. No. 484,912

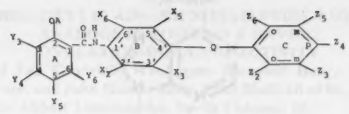
Int. Cl.² A01N 9/36

U.S. Cl. 424—219 **20 Claims**

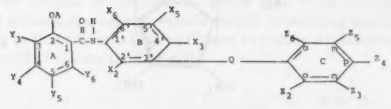
1. Method for killing insects which comprises contacting insects or their habitats with an insecticidally effective amount of the compound of the formula



wherein R and R^1 individually are alkyl, alkenyl or alkynyl of up to 6 carbon atoms, R^3 is hydrogen or alkyl of 1 to 6 carbon atoms, R^2 is hydrogen, alkyl of 1 to 18 carbon atoms, cycloalkyl of 3 to 8 carbon atoms, alkenyl of 2 to 18 carbon atoms or alkynyl of 3 to 18 carbon atoms and Y is oxygen or sulfur.



or



or a pharmaceutically acceptable salt thereof, wherein

A is hydrogen or loweralkanoyl containing 2–4 carbon atoms;

Y_3 is hydrogen, halogen, cyano, nitro or loweralkyl containing 1–4 carbons;

Y_4 is hydrogen or trifluoromethyl

Y_5 is hydrogen, halogen, or nitro;

Y_6 is hydrogen, halogen, hydroxy, loweralkoxy containing 1–4 carbons, or loweralkanoyloxy containing 2–4 carbons;

X_2 is hydrogen, hydroxy, halogen, nitro, trifluoromethyl, or loweralkoxy containing 1–4 carbons;

X_3 is hydrogen, halogen, trifluoromethyl, nitro, amino or loweralkoxy containing 1–4 carbons;

X_5 is hydrogen or halogen;

X_6 is hydrogen or halogen;

Q is oxygen or sulfur;

Z_2 is hydrogen, halogen, or loweralkyl containing 1–4 carbons;

Z_3 is hydrogen, halogen, trifluoromethyl, loweralkyl containing 1–4 carbons, or cyano;

Z_4 is hydrogen, halogen, cyano, nitro, trifluoromethyl loweralkyl containing 1–4 carbons, or loweralkoxy containing 1–4 carbons;

Z_5 is hydrogen, halogen, or trifluoromethyl; and

Z_6 is hydrogen or halogen;

provided that no more than three substituents other than hydrogen are present on any one of the aromatic rings at any one time.

3,914,418
METHODS OF CONTROLLING LIVER FLUKE INFECTIONS

Arthur A. Patchett, Cranford; Helmut H. Mrozik, Matawan, and Dale R. Hoff, Basking Ridge, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 177,906, Sept. 2, 1971, abandoned, which is a division of Ser. No. 19,487, March 13, 1970, Pat. No. 3,798,258, which is a continuation-in-part of Ser. No. 634,442, April 28, 1967, abandoned, which is a continuation-in-part of Ser. No. 573,474, Aug. 10, 1966, abandoned, which is a continuation-in-part of Ser. No. 555,694, June 7, 1966, abandoned. This application Aug. 24, 1973, Ser. No. 391,199

Int. Cl.² A61K 31/60

U.S. Cl. 424—230 **4 Claims**

1. A method for the treatment of liver fluke infections which comprises orally or parenterally administering to an animal infected with liver fluke, an effective amount of a compound having the formula:

3,914,419
TWO COMPARTMENT ONE UNIT CONSECUTIVELY INJECTABLE LIQUID VITAMIN PACKAGE

Bruce Edwin Haeger, Highland Mills, and Robert Arnold Nash, Spring Valley, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 384,995, Aug. 2, 1973, abandoned. This application Jan. 10, 1975, Ser. No. 540,060

Int. Cl.² A61K 31/59

U.S. Cl. 424—237 **5 Claims**

1. A stable aqueous multivitamin preparation in sterile, storage-stable injectable form in a two compartment hypodermic syringe comprising two incompatible vitamin components each held in a separate compartment of said syringe, one of said components having a pH of 6.8 to 7.6 consisting essentially of:

vitamin A palmitate	0 –	10,000 units
vitamin D_3	0 –	500 units
vitamin E	0 –	30 units
ascorbic acid	90 –	500 mg.
folic acid	0.1 –	1 mg., and
niacinamide	20 –	25 mg.

per milliliter as the vitamin ingredients thereof; in an aqueous carrier; and the other of said components having a pH of 4.5 to 5.5 consisting essentially of:

thiamine hydrochloride	1 –	10 mg.
riboflavin	1 –	10 mg.
niacinamide	55 –	65 mg.
pyridoxine hydrochloride	1 –	15 mg.
cyanocobalamin	5 –	25 mcg.
dexpanthenol	0 –	10 mg., and
biotin	0 –	100 mcg.

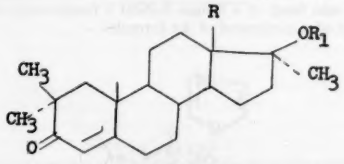
per milliliter as the vitamin ingredients thereof, in an aqueous carrier.

3,914,420
NOVEL ANTIANDROGENIC COMPOUNDS

Jean-Claude Gasc, Bondy, and Vesperto Torelli, Maisons-Alfort, both of France, assignors to Roussel Uclaf, Paris, France

Filed Dec. 3, 1973, Ser. No. 421,089
Claims priority, application France, Dec. 19, 1972, 72.45173
Int. Cl.² A61K *31/56*
U.S. Cl. 424—243 **3 Claims**

1. An antiandrogenic composition comprising an antiandrogenically effective amount of at least one compound of the formula



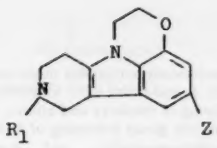
wherein R is alkyl of 1 to 3 carbon atoms and R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and α-tetrahydropyranyl and a pharmaceutical carrier.

3,914,421
PYRIDOPYRROLOBENZHETEROCYCLES FOR COMBATTING DEPRESSION

Parthasarathi Rajagopalan, Westbury, N.Y., assignor to Endo Laboratories, Garden City, N.J.

Continuation-in-part of Ser. No. 263,766, June 19, 1972, abandoned. This application May 7, 1973, Ser. No. 357,528
Int. Cl.² A61K *31/535*
U.S. Cl. 424—248 **6 Claims**

1. A method of combatting depression in a warm-blooded animal which comprises administering to said animal an effective anti-depressant amount of a compound of the formula:



where R_1 is hydrogen, methyl, or cyclopropyl, and
Z is hydrogen or methyl;
or pharmaceutically suitable acid salts thereof.

3,914,422
PROCESS FOR PREPARATION OF COMMON MULLET ROE

Yung Kong Chen, 1111 Arlington Blvd., Suite 319, Arlington, Va. 22209

Filed May 14, 1974, Ser. No. 469,771
Int. Cl.² A23B *4/04*
U.S. Cl. 426—248 **10 Claims**

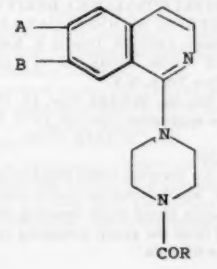
1. A process for preparing mullet roe which comprises the steps of cleansing an ovarian membrane which encloses mullet roe of extraneous material, drying of the ovarian membrane and impregnating it with salt, encapsulating the ovarian membrane containing the roe with absorbent material, placing the envelope of the ovarian membrane with roe so formed on a flat horizontal surface and pressing said envelope from above with a further flat surface whereby the pressure applied to said envelope is sufficient to flatten the ovarian membrane without rupturing same, maintaining application of said pressure for a period of at least eight hours with a surrounding ambient temperature of 40°–100°F. until said envelope is substantially flat, removing application of said pressure from said envelope and stripping same together with the salt and other extraneous material from said ovarian membrane, and drying said ovarian membrane and the enclosed roe for a period of at least 4 days within a predetermined ambient relative humidity of not in excess of 75 percent as required to achieve the desired moisture content of said ovarian membrane and enclosed roe.

3,914,423
QUINAZOLINE AND ISOQUINOLINE BRONCHODILATORS

Timothy H. Cronin, Niantic, and Hans-Jürgen E. Hess, Old Lyme, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 315,617, Dec. 15, 1972, Pat. No. 3,814,760, which is a division of Ser. No. 55,964, July 17, 1970, Pat. No. 3,723,434. This application Feb. 21, 1974, Ser. No. 444,669
Int. Cl.² A61K *31/495*
U.S. Cl. 424—250 **5 Claims**

1. A method for effecting bronchodilator action in a subject afflicted with bronchoconstriction, which comprises administering to said subject an effective amount of a 1-piperazino-6,7-dialkoxyisoquinoline base compound of the formula:



and the pharmaceutically acceptable mono-acid addition salts thereof, wherein A and B are each a member selected from the group consisting of methoxy and ethoxy and R is a member selected from the group consisting of hydroxypyrrolidino, piperidino, hydroxypiperidino and 4-methyl-4-hydroxypiperidino.

3,914,424

METHOD FOR TREATING P-388 OR L-1210 LEUKEMIA STRAINS

Kwang Yuen Zee-Cheng, Overland Park, Kans., and Chia-Chung Cheng, Kansas City, Mo., assignors to The United States of America as represented by the Secretary of the Department of Health, Education and Welfare, Washington, D.C.

Division of Ser. No. 328,074, Jan. 30, 1973, Pat. No. 3,835,340. This application Feb. 22, 1974, Ser. No. 444,920

Int. Cl.² A61K *27/00*

U.S. Cl. 424—258 **3 Claims**

1. A method for the treatment of P-388 or L-1210 leukemia strains which comprises internally administering to a mouse inflicted with one of said strains an antineoplastic amount of coralyne chloride.

3,914,425

ANTITUSSIVE CODEINE COMPOSITION

Karl Heinrich Jaeger, Obereggenen, Germany, assignor to Solco Basel AG, Birsfelden, Switzerland

Filed May 1, 1974, Ser. No. 465,890

Int. Cl.² A61K *31/485*

U.S. Cl. 424—260 **2 Claims**

1. An antitussive composition containing, as active ingredients, a pharmaceutically acceptable salt of codeine and a pharmaceutically acceptable acid addition salt of 6-amino-2-methyl-2-heptanol, the amount of said acid addition salt being at least equal to but not greater than four times the weight of said salt of codeine.

3,914,426

PIPERIDINESULFONYLUREA DERIVATIVES FOR LOWERING BLOOD SUGAR LEVELS

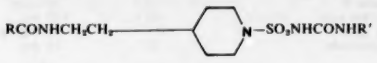
George R. Evanega, Ledyard; Donald E. Kuhla, Gales Ferry, and Reinhard Sarges, Mystic, all of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 305,594, Nov. 10, 1972, Pat. No. 3,829,434. This application Apr. 26, 1974, Ser. No. 464,331

Int. Cl.² A61K *27/00*

U.S. Cl. 424—266 **13 Claims**

1. A method for lowering blood sugar in the treatment of a diabetic animal, which comprises orally administering to said animal an effective blood sugar lowering amount of a compound selected from the group consisting of 1-piperidinesulfonylurea of the formula



and a base salt thereof with a pharmacologically acceptable cation, wherein R is a member selected from the group consisting of 2-methoxy-3-pyridyl, 2-ethoxy-3-pyridyl, and 4-chloro-2-pyridyl, and R′ is a member selected from the group consisting of bicyclo-[2.2.1]hept-5-en-2-yl-endo-methyl, bicyclo[2.2.1]-hept-2-yl-endo-methyl, 7-oxabicyclo-[2.2.1]hept-2-ylmethyl, 1-adamethyl and cycloalkyl having from 5 to 8 carbon atoms.

3,914,427

COMBATING FUNGI WITH 1-ETHYLIMIDAZOLES

Wolfgang Krämer; Karl Heinz Büchel; Werner Meiser, all of Wuppertal; Paul-Ernst Frohberger, and Hans Scheinpflug, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

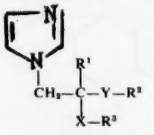
Filed Feb. 1, 1974, Ser. No. 438,887

Claims priority, application Germany, Feb. 9, 1973, 2306495

Int. Cl.² A01N *9/22*

U.S. Cl. 424—273 **12 Claims**

1. The method of combating fungi which comprises applying to said fungi or a fungus habitat a fungicidally effective amount of a compound of the formula



in which

R^1 and R^3 each individually is hydrogen; alkyl or alkenyl of up to 6 carbon atoms; cycloalkyl or cycloalkenyl of up to 7 carbon atoms; or aryl of 6 to 10 carbon atoms or alkyl substituted by aryl of 6 to 10 carbon atoms either optionally carrying up to 3 halogen, haloalkyl with up to 2 carbon atoms and 2 to 5 halogen atoms, nitro, cyano, phenyl, hydroxymethyl-substituted phenyl, or alkyl alkoxy, alkylthio or alkylsulfonyl radicals wherein the alkyl moieties have up to 4 carbon atoms;

R^2 is alkyl, alkenyl or alkynyl of up to 6 carbon atoms; cycloalkyl or cycloalkenyl of up to 7 carbon atoms; or aryl of 6 to 10 carbon atoms or alkyl substituted by aryl of 6 to 10 carbon atoms either optionally carrying up to 3 halogen, haloalkyl with up to 2 carbon atoms and 2 to 5 halogen atoms, nitro, cyano, phenyl, hydroxymethyl-substituted phenyl, or alkyl, alkoxy, alkylthio or alkylsulfonyl radicals wherein the alkyl moieties have up to 4 carbon atoms;

Y is oxygen or sulfur, and

X is —CO—, the oxime or hydrazone thereof.

3,914,428

METHOD OF USING 2-ARYLIMINO-1,3-DITHIETANE COMPOUNDS AS GROWTH PROMOTANTS

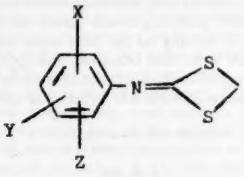
Robert Daniel Wilbur, Titusville, and Joseph Michael Pensack, Trenton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 409,838, Oct. 26, 1973, abandoned. This application Sept. 23, 1974, Ser. No. 508,134

Int. Cl.[2] A61K *31/385*

U.S. Cl. 424—277 11 Claims

1. A method for improving feed efficiency and enhancing the growth rate of poultry and animals selected from the group consisting of chickens, turkeys, mink, rabbit, sable, sheep, cattle, swine and goats, comprising orally or parenterally administering to said poultry and animals a growth promoting amount of a compound having the formula:



wherein X is a member selected from the group consisting of halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, thiocyano, nitro, pyrrolidinylsulfonyl, dithietane, C_1–C_4 alkylthio and C_1–C_4 alkylsulfonyl; Y is a member selected from the group consisting of hydrogen, halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy and $—CO_2R$ wherein R is C_1–C_4 alkyl and Z is a member selected from the group consisting of hydrogen, chloro and C_1–C_4 alkyl.

3,914,429

CERTAIN EPOXY COMPOUNDS FOR INSECT CONTROL

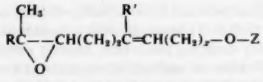
William S. Bowers, Geneva, N.Y., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 363,295, May 23, 1973, Pat. No. 3,852,472, which is a division of Ser. No. 78,577, Oct. 6, 1970, abandoned. This application Aug. 22, 1974, Ser. No. 499,809

Int. Cl.[2] A01N *9/28*

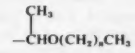
U.S. Cl. 424—278 1 Claim

1. A method of preventing the hatching of eggs of the insects *Epilachna varivestis* comprising applying to said insect eggs an effective egg hatch preventive amount of a compound of the formula:

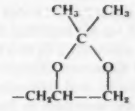


wherein R and R′ are straight chain alkyls containing from 1 to 2 carbon atoms; *x* is a number from 1 to 2; and Z is selected from the group consisting of $—(CH_2)_2O(CH_2)_nCH_3$ in which *n* is a number from 0 to 1;

in which *n* is a number from 0 to 1;



in which *n* is a number from 0 to 3; and



said compound being applied as a solute in acetone.

3,914,430

FREE-FLOWING, HIGH DENSITY, AGGLOMERATED VITAMIN E POWDER COMPOSITIONS

Marco Alfred Cannalonga, Fort Lee, and Louis Vincent Czarecki, Succasunna, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 242,789, April 10, 1972, abandoned. This application June 26, 1974, Ser. No. 483,342

Int. Cl.[2] A61K *31/355*

U.S. Cl. 424—284 2 Claims

1. A spray-dried free-flowing vitamin E active powder composition for use in direct compression tabletting techniques, comprising, in percents by weight based on the total weight of the composition, from about 45% to about 60% of dl-α-tocopheryl acetate, from about 38% to about 53% of a hydrolyzed gelatin having an O Bloom and a molecular weight of about 9,000 to 11,000, about 0.1% of sodium benzoate, about 0.2% of sorbic acid and from about 1% to about 3% of silicic acid, said powder composition in the form of agglomerated particles having a bulk density range of from 25 to 32 pounds per cubic foot and a particle size range wherein from 75% to 100% of the particles are in the range of from 74 microns to 287 microns.

3,914,431

CERTAIN TETRAORGANOTIN COMPOUNDS USED AS INSECTICIDES

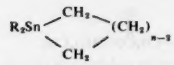
Peter Albert Theodore Hoye, and Roger Geoffrey Hargreaves, both of Stourbridge, England, assignors to Albright & Wilson Limited, Oldbury, England

Continuation-in-part of Ser. No. 177,163, Sept. 1, 1971, abandoned. This application Mar. 1, 1974, Ser. No. 447,146

Int. Cl.[2] A01N *9/00*

U.S. Cl. 424—288 4 Claims

1. A method for killing insects which consists of applying to said insects an effective amount of a formulation containing between 0.1 and 200,000 parts per million, based on the weight of said formulation, of a tetraorganotin compound of the formula



wherein each R represents alkyl containing between 1 and 4 carbon atoms, cyclohexyl, benzyl, 2-ethylphenyl or phenyl and *n* represents the integer 4, 5 or 6, the remainder of said formulation consisting essentially of an inert carrier selected from the group consisting of lime, gypsum, talc, ash, kaolin, water, organic liquids and volatile aerosol propellants.

3,914,432
PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(CYANO-PHENOXY)-2-HYDROXY-3-ALKYLAMINO-PROPANE AND METHOD OF USE

Herbert Köppe; Werner Kummer; Helmut Stähle; Karl Zeile, all of Ingelheim am Rhein, and Albrecht Engelhardt, Main (Rhine), all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

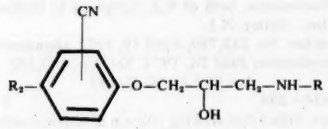
Division of Ser. No. 204,316, Dec. 2, 1971, Pat. No. 3,872,147, which is a continuation of Ser. No. 781,985, Dec. 6, 1968, abandoned. This application Jan. 16, 1975, Ser. No. 541,430

Claims priority, application Germany, Dec. 13, 1967, 1643262

Int. Cl.² A61K *31/275*

U.S. Cl. 424—304 **6 Claims**

1. A pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective β-adrenolytic or hypotensive amount of compound of the formula



wherein

R is branched alkyl of 5 to 8 carbon atoms containing a quaternary carbon atom which is attached directly or through an alkylene chain of 1 to 4 carbon atoms to the amino nitrogen atom, and

R_2 is hydrogen or chlorione,

or a non-toxic pharmacologically acceptable acid addition salt thereof.

3,914,433
METHOD OF RELIEVING THE DISCOMFORT OF PHARYNGITIS

John W. Ward, Richmond, and Robert A. Lybrand, Ashland, both of Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Continuation-in-part of Ser. No. 167,869, July 30, 1971, abandoned. This application June 20, 1973, Ser. No. 371,805

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² A61K *31/185*

U.S. Cl. 424—315 **2 Claims**

1. A method for the alleviation of discomfort of a human being having pharyngitis which consists of said human being gargling for a period of from about 15 seconds to about three minutes with an effective amount of a composition containing 0.5 to 20 percent of a lignosulfonate having a molecular weight greater than 10,000 and a pharmaceutically acceptable carrier therefor, said gargling followed by expectoration.

2. A method for the alleviation of discomfort of a human being having pharyngitis which consists of said human being sipping in small portions over a period of two to four minutes an effective amount of a composition containing 0.5 to 20 percent of lignosulfonate having a molecular weight greater than 10,000 and a pharmaceutically acceptable carrier therefor.

3,914,434
NON-CARIOGENIC FOODS AND DELICACIES CONTAINING XYLITOL AS A SUGAR SUBSTITUTE

Erika Bohni, Basel, Switzerland, assignor to Hoffman-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 248,293, April 27, 1972, which is a continuation of Ser. No. 63,925, Aug. 14, 1970. This application Dec. 7, 1973, Ser. No. 422,639

Claims priority, application Switzerland, Aug. 22, 1969, 12767/69

Int. Cl.² A61K *5/00*

U.S. Cl. 424—343 **1 Claim**

1. A method of moderating the incidence of severe dentine lesions and thereby inhibiting dental caries which comprises orally ingesting, or feeding, as the total sugar content of the diet of individuals with teeth otherwise susceptible to caries caused by the ingestion of sugar, nutrient media containing xylitol sugar substitute as the sole sweetening agent.

3,914,435
MANUFACTURE OF CHEESE FROM ULTRAFILTERED MILK

Jean-Louis Joseph Maubois, Rennes; Germain Pierre Charles Gabriel Mocquot, Versailes, and Louis Jean Vassal, Jouy En Josas, all of France, assignors to Institut National de la Recherche Agronomique, Paris, France

Continuation-in-part of Ser. No. 299,837, Oct. 24, 1972, which is a continuation-in-part of Ser. No. 53,002, July 7, 1970, abandoned. This application Jan. 5, 1973, Ser. No. 321,125

Claims priority, application France, July 18, 1969, 69.24555; Jan. 7, 1972, 72.00507

Int. Cl. A23c *19/02*

U.S. Cl. 426—40 **8 Claims**

1. A process for making cheese from milk consisting essentially of the steps of separating said milk by ultra filtration into a first liquid filtrate component and a second retained liquid retentate component by contacting said milk with a semipermeable membrane, the average pore diameter of which is at most equal to 30 mμ, at a pressure of from 1 to 50 kg/cm², said first liquid filtrate component passing through and said semipermeable membrane and said second liquid retentate component not passing through said semi-permeable membrane and having a higher concentration of proteins than said first liquid component, the pore diameter of said semi-permeable membrane and said pressure being selected so that the lactose and minerals salts in the aqueous phase of the milk pass through the semi-permeable membrane in substantially the proportions they appear in said aqueous phase and so that substantially no proteins pass through the semi-permeable membrane, maintaining said second liquid retentate under agitated conditions adjacent said membrane and continuing contacting said second liquid retentate component with a semi-permeable membrane as defined above under the foregoing pressure and agitation conditions until a liquid milk retentate is obtained suitable for conversion into a cheese of a desired type in the conventional manner having a concentration of proteins substantially equal to at least about 1.5 times that of the starting milk and having a composition of proteins and soluble components including lactose and mineral salts which is substantially equal to those found in cheese prepared from milk at the end of ordinary whey draining processes, heating either said milk prior to ultrafiltration or said liquid retentate at a temperature of from 110° – 150°C for a period of time sufficient to sterilize said milk or retentate, adding rennet to said liquid retentate to coagulate said retentate and thereby produce cheese cured from said retentate, and thereafter coverting said cheese curd into cheese.

3,914,436

PROCESS FOR MANUFACTURING SOY SAUCE USING ENZYMATIC PREPARATION(S)

Tadanobu Nakadai; Seiichi Nasuno, and Nobuyoshi Iguchi, all of Noda, Japan, assignors to Noda Institute For Scientific Research, Noda, Japan

Filed Dec. 11, 1973, Ser. No. 423,654
Claims priority, application Japan, Dec. 11, 1972, 47-123388; Dec. 26, 1972, 47-129550
Int. Cl.² A23L *1/238*
U.S. Cl. 426—46 17 Claims

1. A process for manufacturing soy sauce which comprises mixing denatured proteinous and denatured amyloidal raw materials for soy sauce in a ratio of 0.2 to 0.8 part by weight of amyloidal raw material to 1 part by weight of proteinous raw material before denaturing, an enzymatic preparation or a mixture of enzymatic preparations comprising proteinase, aminopeptidase, α-amylase and carboxymethylcellulase in the rate of 3,000 units or more per gram of crude protein of raw materials, 0.8 unit or more per gram of crude protein of raw materials, 4,000 units or more per gram of starch of raw materials and 60 units or more per gram of crude cellulose of raw materials, respectively, and aqueous sodium chloride solution, the concentration of the aqueous sodium chloride solution being such that the concentration of sodium chloride in the fermented soy sauce is 13–20%, and incubating the resultant mixture for 3 to 6 months whereby said mixture is subjected to enzymatic action, fermentation and aging.

3,914,437

OSMOTIC PRESSURE CONTROL TO IMPROVE THERMOPHILIC MICROORGANISM GROWTH

Winthrop D. Bellamy, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 30, 1974, Ser. No. 465,507
Int. Cl.² A12K *1/00*
U.S. Cl. 426—53 6 Claims

1. In the method for growth of cellulolytic and ligninolytic Thermoactinomyces in an aqueous liquid medium in a fermentor on biodegradable organic waste material containing cellulose and/or lignin in the presence of requisite mineral salts at a temperature in the range of 45°C to 80°C, a pH in the range of from about 7.0 to about 8.5 and an oxygen concentration of 0.3 to 2.0 mg. per liter, the improvement comprising establishing and maintaining the osmotic pressure of said aqueous liquid medium in said fermentor at a value in the range between the osmotic pressure that would be induced at said temperature in pure water by the dissolution therein of 0.5% by weight of sodium chloride and the osmotic pressure that would be induced at said temperature in pure water by the dissolution therein of 3.3% by weight of sodium chloride.

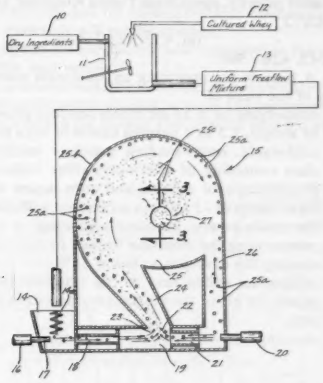
3,914,438

NUTRIENT COMPOSITION AND METHOD FOR MAKING SAME

Lemmie C. Holt, Rte. 1, Box 310, Lakeland, Fla. 33803, and Ernest Paul Hansen, 908 Pleasant View Drive, Storm Lake, Iowa 50588

Filed Oct. 3, 1973, Ser. No. 403,286
Int. Cl.² A23C *21/00*; C05F *11/08*
U.S. Cl. 426—61 35 Claims

1. In a nutrient composition for animals and plants comprising a cultured natural whey product portion and a mineral mix portion, the particle size of said composition being less than 44 microns, the improvement comprising: that substantially all of the particles of said composition comprise a physically united composite created by particle collisions each of said



composite particles having some portion of the whey product and some portion of the mineral mix portion present.

3,914,439

DRY PARTICULATE FLAVOR COMPOSITION, METHOD OF MAKING SAME AND USE THEREOF

Robert E. Graves, Washingtonville, N.Y., assigno[illegible] pard Chemical Industries, Inc., New York, N.Y.

Filed Aug. 16, 1974, Ser. No. 498,077
Int. Cl.² B65B *29/02*; A23L *1/216*
U.S. Cl. 426—78 33 Claims

1. A dry, free-flowing particulate flavor composition comprising a crystalline sugar core having at least two hydrogenated vegetable oil layers surrounding said core, at least one liquid flavor oil layer between said two hydrogenated vegetable oil layers and absorbed thereon, and an outer coating of an edible shellac.

3,914,440

STABILIZED FROZEN THICK SHAKE

Ralph P. Witzig, New City, N.Y., assignor to General Foods Corporation, White Plains, N.Y.

Filed Feb. 14, 1973, Ser. No. 332,474
Int. Cl.² A23G *9/04*
U.S. Cl. 426—130 9 Claims

1. The process of preparing a stabilized frozen aqueous thick shake comprising an emulsion of sugar and fat having discrete water ice crystals therein which comprises formulating an aqueous mixture of at least 15% sugar, fat, xanthan gum and algin, pasteurizing the formulation, incorporating therein a polyvalent cation source operative to form a water insoluble alginate for complexing and for stabilizing the shake in combination with the xanthan gum, homogenizing the formulation at a pressure above 3000 psig to produce an emulsion having dispersed fat globules where numerical majority is less than 50 microns, cooling to crystallize a portion of the aqueous phase in the composition after homogenization to produce a quality of discrete water ice crystals and injecting air therein to produce an overrun between 5–25%, charging the composition at below 20°F, to a package filler, packaging the composition, and freezing and cooling the packaged composition to a center temperature below 0°F.

3,914,441
ICE CREAM
David John Finney; John Richard Ravenhill, and Malcolm John Tait, all of Stevenage, England, assignors to Lever Brothers Company, New York, N.Y.
Filed Dec. 7, 1973, Ser. No. 422,647
Claims priority, application United Kingdom, Dec. 15, 1972, 57943/72
Int. Cl.² A23G 9/04
U.S. Cl. 426—565 8 Claims

1. A process for preparing an ice cream consisting essentially of the steps of:
a. emulsifying fat in an ice cream aqueous phase containing, by weight, 1.5 to 4 percent casein or soya protein and an acid-stable, water-binding stabilizer selected from the class consisting of micro-crystalline cellulose, dextran, propyleneglycol alginate and corn sugars with Dextrose Equivalents of 15 to 25 in an amount sufficient to prevent the casein or soya protein coagulating;
b. pasteurizing the emulsion formed in step (a);
c. cooling the emulsion to below 15°C;
d. adding an edible acid to the emulsion below 15°C to adjust the pH of the cooled emulsion to from 3.0 to 3.85 and,
e. freezing and whipping the emulsion.

3,914,442
STABILIZATION OF VODKA
Gildo J. Servadio, Simsbury; Arthur W. Perreault, East Granby, and John C. Jones, South Windsor, all of Conn., assignors to Heublein, Inc., Hartford, Conn.
Continuation of Ser. No. 270,399, July 10, 1972, abandoned. This application June 10, 1974, Ser. No. 478,135
Int. Cl.² C12H 1/04
U.S. Cl. 426—271 4 Claims

1. A process for stabilization of vodka consisting essentially of the steps of treating vodka in the liquid phase with activated charcoal to remove or decrease the concentration of congenerics responsible for taste and odor in said vodka and treating the charcoal-treated vodka with a highly-crosslinked nuclear sulfonic macroporous polystyrene cationic exchange resin to remove polyvalent calcium and manganese ions introduced into said vodka by said treatment with activated charcoal and to control the pH of the vodka so that it lies within the range of about 7.2 to about 9.

3,914,443
PROCESS FOR PREPARING MEAT-LIKE FOODSTUFFS
Takashi Sakita, and Gyota Taguchi, both of Yokohama, Japan, assignors to The Nisshin Oil Mills, Ltd., Japan
Continuation of Ser. No. 265,450, June 23, 1972, abandoned. This application June 24, 1974, Ser. No. 482,272
Claims priority, application Japan, Feb. 1, 1972, 47-10945
Int. Cl.² A23J 3/00
U.S. Cl. 426—274 7 Claims

1. A process for preparing meat-like foodstuffs by impregnating edible protein fibers with a composition containing a binder and heating the impregnated fibers to solidify said binder, wherein the binder consists essentially of a heat-denatured soybean protein capable of gel formation and gelatin, said binder being used in an amount sufficient to bind the fibers after heating, and wherein the heat-denatured soybean protein capable of gel forming and gelatin are present in the binder from 20 to 90 parts by weight and from 5 to 30 parts by weight, respectively, based on 100 parts by weight of the protein fiber solids.

3,914,444
PREPARATION OF SLICED DRIED BEEF PRODUCT
Joseph T. Svacik, Chicago, Ill., assignor to Armour and Company, Phoenix, Ariz.
Filed Mar. 29, 1973, Ser. No. 346,049
Int. Cl.² A22C 11/02
U.S. Cl. 426—284 9 Claims

1. In a process for preparing a dried beef product which includes the steps of stuffing pieces of beef along with common salt as a seasoning agent and sodium nitrite as a curing agent into a preformed fibrous casing and holding the stuffed casing in a cool atmosphere at a temperature of about 36° to 40°F for a period of time sufficient to develop a cure by said sodium nitrite, the improvement which includes the steps of drying the cured meat following said period by immersing the cured meat while contained in said casing in a solution of common salt having a concentration of from 8 to 26 percent and holding said cured meat while so immersed at a temperature of about 170° to 210°F. for a period of time sufficient to remove a substantial amount of moisture from said meat.

3,914,445
INTERMEDIATE MOISTURE FORMULATED FOODS AND PROCESS
Robert L. Pavey, Western Springs, Ill., assignor to Swift & Company, Chicago, Ill.
Filed June 10, 1974, Ser. No. 477,589
Int. Cl. A22c 18/00; A23l 3/00
U.S. Cl. 426—326 7 Claims

1. A process for preparing ready-to-eat, shelf-stable formulated foods, comprising: adding an edible humectant to conventionally prepared food formulations in an amount of from about 3 to about 8% by weight of the final product; adding an effective level of an antimycotic to prevent mold growth; cooking the formulated product; and vacuum drying the cooked product to reduce the available water (A_w) to a desired intermediate moisture level of from about 0.80 to about 0.85.

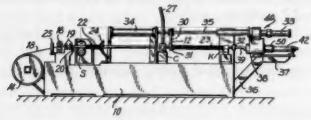
3,914,446
METHOD OF PRODUCING FREEZE-DRIED BACON SLICES
Larry C. Hinnergardt, Franklin, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.
Filed Aug. 21, 1974, Ser. No. 499,247
Int. Cl.² A23L 1/31
U.S. Cl. 426—385 2 Claims

1. A method of producing freeze-dried bacon slices characterized by freedom from spattering when being heated which comprises the steps of freezing raw bacon slices at about −10°F. and then freeze-Vacuum dehydrating the frozen raw bacon slices to a moisture content of not more than 5 percent while maintaining the platen temperature employed in said freeze-vacuum dehydrating step at about 125°F. and maintaining the pressure employed in said freeze-vacuum dehydrating step at about 0.3 mm. of mercury.

3,914,447
METHOD OF FORMING ANY END CLOSURE IN A HOLLOW SHIRRED FOOD CASING
Valdis M. Tums, Palos Park, and Thomas J. Maxwell, Lockport, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.
Division of Ser. No. 242,932, April 11, 1972, Pat. No. 3,865,954. This application Jan. 3, 1975, Ser. No. 538,458
Int. Cl.² A22C 13/00
U.S. Cl. 426—390 4 Claims

1. A method of forming an end-closure implanted in a hollow shirred food casing stick which comprises:

a. inserting a rod member into the end of a shirred casing stick without engaging any portion of said casing stick;
b. progressively twisting terminal pleats from the end of said shirred casing stick through which said rod member is inserted, into said stick about said rod member until a close-packed funnel-shaped knot of casing is formed about said rod member, said funnel-shaped knot of casing



comprising a first portion of casing material that is progressively twisted into a generally cylindrically shaped knot totally within said shirred casing stick and a second portion of casing material that is twisted into a generally conically-shaped knot; and then
c. withdrawing said rod member from within the close-packed knot of casing without disturbing the closure formed thereby.

3,914,448

PROCESS FOR PREPARING EGG NOODLES AND THE RESULTING PRODUCT

Tsuneo Takeuchi; Masaki Terada; Mitsumune Takatsu; Junichi Minami, all of Osaka, and Shohei Otani, Hyogo, all of Japan, assignors to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 225,321, Feb. 10, 1972, abandoned. This application Apr. 8, 1974, Ser. No. 459,185
Int. Cl.² A23L *1/16*
U.S. Cl. 426—557 **7 Claims**

1. In the process of roller molding an egg noodle from a mixture of flour and egg wherein said mixture is formed into a dough and passed through rollers and dried, the improvement which comprises utilizing as the egg source egg which has been treated with a proteolytic enzyme, whereby the degradation degree of said egg is from about 1.0 to about 10.0%.

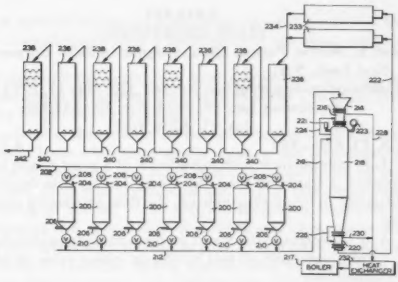
3,914,449

METHOD FOR INTRODUCING MATERIALS INTO OR REMOVING MATERIALS FROM A HERMETICALLY SEALED VESSEL

Joe L. McPhail, Houston, Tex., assignor to Pfeffer & Son, Harris County, Tex.

Continuation of Ser. No. 68,969, Sept. 2, 1970, abandoned, which is a division of Ser. No. 711,425, March 7, 1968, Pat. No. 3,554,114. This application Dec. 17, 1973, Ser. No. 425,568
Int. Cl.² A23L *1/01*
U.S. Cl. 426—461 **17 Claims**

1. In the method of parboiling rice which comprises soaking, cooking and drying the rice, the improvement comprising transferring soaked rice maintained at ambient pressure to a cooking vessel, said cooking vessel being at a pressure higher than the ambient pressure environment in which said soaked rice is maintained by:
a. equalizing the pressure within a container to ambient pressure;
b. opening a first butterfly valve means connected to said container and communicating between said ambient pressure environment and container to transfer the soaked rice into the container from said environment by operating a first power means for opening and closing said first valve means, said first power means being positioned externally of the container, said first valve means having a closure member movably positioned within the body of said first valve means;
c. closing said first valve means to hermetically seal said container by frictionally engaging the closure member of said first valve means with a resilient annular rubber seal positioned within the body of said first valve means, said closure member of said first valve means engaging only said first annular seal for closing the first valve means so that the materials will not be crushed;
d. equalizing the pressure within said container to the pressure within said vessel;
e. opening a second butterfly valve means connected to said container and communicating between the container and vessel to transfer the soaked rice directly into the vessel



from the container through said second valve means by operating a second power means for opening and closing said second valve means, said second power means being positioned externally of the container, said second valve means having a closure member movably positioned within the body of said second valve means; and
f. closing said second valve means to hermetically seal said container and said vessel by frictionally engaging the closure member of said second valve means with a second resilient annular rubber seal positioned within the body of said second valve means, said closure member of said second valve means engaging only said second annular seal for closing the second valve means so that the soaked rice will not be crushed.

3,914,450

CONCENTRATED EXTRACT OF YEAST AND PROCESSES OF MAKING SAME

Ernest Aleck Robbins, High Ridge; Robert William Sucher, St. Louis County; Robert Dudley Seeley, Crestwood; Erich Henry Schuldt, Jr., St. Louis County; Jon Albert Newell, Webster Groves, and Daniel Robert Sidoti, Ballwin, all of Mo., assignors to Anheuser-Busch, Incorporated, St. Louis, Mo.

Filed Apr. 9, 1973, Ser. No. 349,316
Int. Cl.² A23J *1/18*; A23L *1/28, 1/231*
U.S. Cl. 426—533 **12 Claims**

4. A process for producing a yeast extract product comprising the steps of:
a. rupturing yeast cells containing yeast protein,
b. insolubilizing a majority of the protein and separating the remaining solubles fraction containing nucleic acid and other cytoplasmic materials from the insolubilized protein and the cell wall debris of the original yeast cells, said solubles fraction containing on a moisture free and ash free basis from about 52% to about 71% crude protein, from about 9% to about 18% nucleic acid, and a glutamic acid residue content which constitutes about 20% to about 45% of the corrected protein,
c. concentrating said solubles fraction at least to a solids content of about 25% with a "buttery-fatty" character.

3,914,451
IMPARTING A NUTTY FLAVOR WITH 2-BUTYL-2-BUTENAL

William J. Schreiber, Jackson; Alan O. Pittet, Atlantic Highlands; Manfred Hugo Vock, Locust, all of, NJ; Edward J. Shuster, Brooklyn, N.Y., and Alton Dewitt Quinn, Abrahamsville, Pa., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 389,128, Aug. 17, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,946
Int. Cl.² A23L *1/226*
U.S. Cl. 426—534 **2 Claims**

1. A process for altering the flavor of foodstuff which comprises adding to said foodstuff, in an amount to impart thereto a nutty flavor, 2-butyl-2-butenal.

3,914,452
FLUID SHORTENING

Max E. Norris, Parma, Ohio, assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 361,320, May 17, 1973. This application Jan. 17, 1974, Ser. No. 434,128
Int. Cl. A23d *3/00*
U.S. Cl. 426—549 **4 Claims**

1. In combination with ingredients of a yeast raised baking product, a stabilized fluid shortening having beta-fat crystals dispersed in liquid vegetable oil, the fluid shortening comprising;

4 to 14 weight parts of soft mono- and diglycerides derived from vegetable oil and having an iodine value of at least about 40;

2 to 8 weight parts of ester emulsifiers selected from ethoxylated monoglyceride, ethoxylated sorbitan, ethoxylated mannitans, ethoxylated monooleates sodium stearoyl-1-lactylate, calcium stearoyl-2-lactylate, sodium stearoyl-2-lactylate, ethoxylated propylene glycol monoesters, ethoxylated triglycerol monostearate, and succinylated monoglyceride;

2 to 8 weight parts of solid stearine; and

about 40 to 100 weight parts of liquid vegetable wherein said soft mono- and diglycerides, said ethoxylated monoglycerides, and said solid stearine are dispersed by heating to form a liquified molten mixture followed by quick chilling to about 82° to 88°F. to form beta-fat crystals and a stabilized substantially uniform dispersion within said liquid vegetable oil.

3,914,453
PROCESS FOR PREPARING BAKERY PRODUCTS

Ilija Gawrilow, Strongsville, Ohio, assignor to SCM Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 257,154, May 26, 1972, abandoned. This application Sept. 9, 1974, Ser. No. 504,258
Int. Cl.² A21D *13/08;* **A23G** *3/00*
U.S. Cl. 426—553 **10 Claims**

1. In a process for preparing bakery products including breads, cakes, sweet goods, icings, toppings, fillings, and fondants wherein a minor proportion of shortening is blended with a major proportion of other comestible wet and dry ingredients to form a fluent culinary mixture which is subsequently baked or aerated to produce said bakery products, the improvement which comprises:

1. providing and maintaining in a molten state at a temperature between 120° and 160°F. a shortening composition which is normally plastic at room temperature, and consisting essentially of:

a. from 77 to 94% by weight, based on the composition of an edible triglyceride fat derived from fatty acids containing 12–22 carbons and characterized by having a Wiley Melting Point between about 90° and 140°F., and the ability to form, on cooling, stable crystalline bodies preponderantly of the beta-prime phase configuration;

b. from 1.5 to 8% by weight of edible mono-glycerides;

c. from 2 to 8% by weight of edible polyglycerol esters;

d. from 0.5 to 2% of a member selected from the group consisting of edible ethoxylated sorbitan esters and edible ethoxylated mono-glycerides;

e. from 0 to 3% by weight of edible diglycerides; and

f. from 0 to 2% by weight of an edible phospholipid; said monoglycerides and diglycerides, polyglycerol esters, ethoxylated sorbitan esters, and ethoxylated monoglycerides all containing fatty acid components having 16–22 carbons; and

2. blending a proportion of said molten shortening with substantially all of said other dry and wet ingredients thereby forming said fluent culinary mixture.

3,914,454
PREPARATION OF CEREAL FOODS

Mitsumune Takatsu, Kusatsu; Fumio Ohnishi, Osaka, and Junichi Minami, Tondabaya, all of Japan, assignors to Nissin Shokuhin Kaisha, Ltd., Osaka, Japan

Filed Nov. 29, 1973, Ser. No. 419,946
Claims priority, application Japan, June 18, 1973, 48-68410; June 18, 1973, 48-68411; June 18, 1973, 48-68412
Int. Cl.² A23L *1/00, 1/10*
U.S. Cl. 426—309 **7 Claims**

1. A method for preparing cereal foods comprising

a. washing cereal particles with water;

b. uniformly coating the washed particles which have been freed of water with a non-toxic substance to prevent agglomeration during subsequent treatment;

c. treating the coated particles with pressurized steam to gelatinize the particles;

d. drying the gelatinized particles to a water content of 8–25% by weight;

e. frying the dried particles in an edible oil at a temperature of 150°–220°C for a period of time up to one minute; and immediately thereafter

f. removing oil from the fried particles to reduce the oil content to less than 16.5% by weight; thus providing a cereal food which is ready for consumption after mixing with hot water for a short period of time.

3,914,455
FLAKED TEXTURIZED PROTEIN

Kenneth J. Valentas, and Willibald M. Lindl, both of Minneapolis, Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed Jan. 16, 1974, Ser. No. 433,937
Int. Cl.² A23J *3/00*
U.S. Cl. 426—447 **5 Claims**

1. A method for preparing a texturized, flaked protein material comprising: feeding fine particles of a protein material to a processing zone, said protein material containing at least 30 percent protein by dry weight and being capable of texturization, feeding a heated pressurized gaseous processing fluid including steam into said zone, the temperature of said fluid being at least 250°F. and thereby raising the pressure in said zone to at least 15 p.s.i.g., removing said protein matereial from said zone to a zone of lower pressure thereby texturizing and expanding said protein material and then flaking said texturized, expanded protein material while the protein material is in a pliable condition.

3,914,456

DRY MIX PUDDING COMPOSITION

Norrain E. Norsby, Hopkins, and James R. Schultz, Minnetonka, both of Minn., assignors to General Mills, Inc., Minneapolis, Minn.

Filed July 2, 1973, Ser. No. 376,065
Int. Cl.² A23L *1/187*
U.S. Cl. 426—579 4 Claims

1. A dry mix pudding composition comprising about 70 to 88% sucrose by weight of the dry mix composition, about 3 to 9% pregelatinized waxy maize corn starch by weight of the dry mix composition, about 11 to 19% pregelatinized tapioca starch by weight of the dry mix composition, the total amount of pregelatinized starch being about 16 to 24% by weight of the dry mix composition, and setting salts consisting essentially of an alkali metal pyrophosphate, monocalcium phosphate and a potassium salt selected from potassium sulfate and potassium chloride.

3,914,457

PROCESS FOR PREPARING A PROTEIN-ENRICHED FOOD PRODUCT

Ludmilla V. Nagel, 3206 Liberty Ave., Alameda, Calif. 94501

Filed Apr. 10, 1974, Ser. No. 459,818
Int. Cl.² A23L *1/31*
U.S. Cl. 426—589 3 Claims

1. A process for preparing a protein-enriched food formulation for human consumption, comprising: incorporating seasoning in an amount at least as high as 0.1% of the total weight of resulting product, with a first volume of hot water having a temperature in the range of 110–200°F., said seasoning comprising table salt and a seasoning selected from the group consisting of pepper, garlic, sesame oil, chicken flavored bouillon cubes, beef flavored bouillon cubes, oregano and soups; substantially completely reconstituting and completely flavoring a corresponding second volume of dehydrated extruded soy protein by allowing all of said first volume of seasoned hot water to be absorbed by said second volume of soy protein whereby no further flavoring can be absorbed by the reconstituted soy protein combining said reconstituted soy protein with additional ingredients including a third volume of at least one ground animal protein; and cooking said combination, the ratio of said first, second and third volumes being in the range of 1:1:3 to 15:5:1.

3,914,458

EDIBLE WATER IN OIL EMULSION AND METHOD FOR PREPARING THE SAME

Kimio Terada; Satoshi Fujita, and Noritoki Yoshida, all of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Japan

Filed July 19, 1973, Ser. No. 380,736
Claims priority, application Japan, July 21, 1972, 47-72498
Int. Cl.² A23D *3/00*
U.S. Cl. 426—604 2 Claims

1. An edible liquid water-in-oil emulsion comprising (a) 75–95 % of an oily phase consisting essentially of a glyceride oil which is liquid at 0°C selected from the group consisting of soybean oil, cottonseed oil, corn oil, safflower oil, rapeseed oil, sunflower oil, sesame oil, rice bran oil, groundnut oil, kapok oil, and mixtures thereof; (b) 5–25 % of an aqueous phase consisting essentially of water and (c) 0.1–3% of a sucrose fatty acid ester of HLB 1-4 consisting essentially of (i) 80–100 % of the tri-, tetra- or penta-ester, and mixtures thereof and (ii) 0–20 % of the mono- or di-ester and mixtures thereof.

3,914,459

METHOD OF MAKING A RESTRUCTURED MEAT PRODUCT

Norman Jones, Great Yarmouth, England, assignor to Lever Brothers Company, New York, N.Y.

Filed Jan. 25, 1974, Ser. No. 436,752
Claims priority, application United Kingdom, Jan. 31, 1973, 4838/73
Int. Cl.² A23L *1/31*
U.S. Cl. 426—645 4 Claims

1. A method of making a restructured meat product in the form of small pieces from a comminute of raw meat, comprising:

i. incorporating in the raw meat comminute fibres of set protein in an amount forming from about 5 to about 50% by weight of the comminute;

ii. extruding the comminute thus obtained through a plurality of holes while transversely shearing said comminute at the entrance to said holes, the rate of extrusion of said comminute and the time of shearing of said comminute being so related as to provide successive elements of desired size, followed by reunifying said elements so that there issues from the exit of each of said holes a coherent string of extrudate having spaced along its length lines of weakness resulting from said shearing and said reunifying of said elements;

iii. heat-setting said coherent strings of extrudate at a temperature sufficient to prevent said heat-set strings from adhering to one another during subsequent mechanical working; and

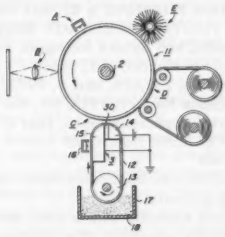
iv. mechanically working said heat-set strings of extrudate to break said strings at said lines of weakness to form granules or sticks thereof.

3,914,460

DEVELOPMENT UTILIZING ELECTRIC FIELDS

John Maksymiak, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jan. 9, 1973, Ser. No. 322,254
Int. Cl. G03g *13/08, 15/08*
U.S. Cl. 427—14 9 Claims



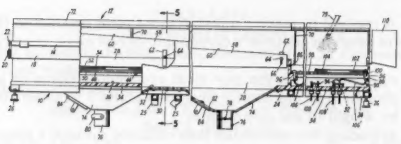
1. A method of developing an electrostatic latent image carried by a surface, said method comprising the steps of:

bringing a toner-laden donor member adjacent said surface in a development zone, and

subjecting the toner to an electric field shaped to first separate toner from the donor member as the toner enters the development zone and to then redeposit toner not attracted to the surface onto the donor member as the toner leaves the development zone, whereby the toner in said development zone is controlled but still readily attract-

able to said surface in conformance with the image thereon.

3,914,461
ELECTROSTATIC COATING METHOD
William C. Goodridge, Branford, Conn., assignor to Electrostatic Equipment Corporation, New Haven, Conn.
Division of Ser. No. 254,472, May 18, 1972, Pat. No. 3,828,729. This application Feb. 4, 1974, Ser. No. 439,347
Int. Cl. B05b 5/02
U.S. Cl. 427—33 10 Claims



1. In a method for electrostatically coating an object, the steps comprising: generating a cloud of electrostatically charged particles adjacent one side of a generally upstanding baffle having an elongated edge portion permitting ready passage thereacross of said charged particles from said cloud, and passing at least an axial portion of an object to be coated laterally adjacent the other side of said baffle along a predetermined travel path which traverses the imaginary, laterally-extending projection surface of said edge portion at a nonperpendicular angle thereto, said baffle initially blocking from contact by said particles at least said axial portion of the object, and causing exposure of progressively lower vertical portions thereof for contact by said particles during passage of the object along said travel path thereby, so as to develop a coating on said axial portion along an axis that is angularly displaced from the axis of said travel path.

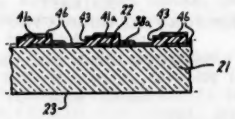
3,914,462
METHOD FOR FORMING A RESIST MASK USING A POSITIVE ELECTRON RESIST
Hajime Morishita, and Saburo Nonogaki, both of Tokyo, Japan, assignors to Hitachi, Ltd., Japan
Division of Ser. No. 259,659, May 5, 1972, abandoned. This application Nov. 19, 1973, Ser. No. 416,873
Claims priority, application Japan, June 4, 1971, 46-38672
Int. Cl.² B05D 3/06; C08F 220/14, 220/44
U.S. Cl. 427—43 19 Claims

1. A method for forming a resist mask comprising:
a. providing a substrate;
b. coating said substrate with a thin cathode ray-sensitive film consisting essentially of a copolymer of 60 to 99.5 mole percent of methylmethacrylate and 0.5 to 40 mole percent of a comonomer selected from the group consisting of acrylonitrile, methacrylonitrile and maleic anhydride;
c. exposing at least a portion of said cathode ray-sensitive film to a cathode ray of an irradiation amount of at least 5×10^{-6} coulomb/cm² in a predetermined pattern leaving at least one unexposed region; and
d. removing said exposed portion of said cathode ray-sensitive film by dissolving in a solvent in which the unexposed region is insoluble thereby forming a resist mask having the predetermined pattern.

3,914,463
METHOD OF PROTECTING SUBSTRATES WITH LIGHT-STABLE VARNISH OR LACQUER
Andrew Mercurio, Hatboro, and Peter R. Sperry, Doylestown, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.
Filed Dec. 15, 1972, Ser. No. 315,752
Int. Cl.² B05D 3/06
U.S. Cl. 427—54 9 Claims

6. The process of claim 1 in which the substrate is wood.

3,914,464
STRIPED DICHROIC FILTER AND METHOD FOR MAKING THE SAME
David G. Thomasson; Frederick K. Crosher; Michael D. Temple; Leroy A. Bartolmei, and Richard Ian Seddon, all of Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.
Division of Ser. No. 135,131, April 19, 1971, Pat. No. 3,771,857. This application May 21, 1973, Ser. No. 362,220
Int. Cl.² B05B 5/02, 1/32
U.S. Cl. 427—54 15 Claims



1. In a method for making a striped dichroic filter on a substantially transparent glass substrate having a surface with the use of a mask having a plurality of spaced parallel stripes thereon, forming a layer of material on said surface of said substrate, removing certain portions of the material so that there remains on said surface a plurality of spaced parallel stripes of said material with exposed areas of said surface therebetween, placing a plurality of layers of high and low index dielectric coating materials on said stripes and on said exposed areas of said surface to a depth which is substantially less than the height of the stripes so that the side walls of the stripes are exposed, and etching away the stripes to permit lifting off of the portions of the dielectric coating materials carried by the stripes so that there remains on said surface a first set of stripes formed of said layers of high and low index dielectric coating materials capable of reflecting at least one color.

3,914,465
SURFACE PASSIVATION OF GaAs JUNCTION LASER DEVICES
John Cameron Dyment, Chatham, and Bertram Schwartz, Westfield, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Sept. 25, 1972, Ser. No. 292,126
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H01I 1/34; H01S 3/19
U.S. Cl. 427—82 10 Claims

1. A method of treating the mirror surfaces of a junction laser device comprising $Z_xGa_{1-x}As$ where $x = 0 - 0.7$ and Z is selected from the group consisting of Al and In in order to provide a protective coating against ambient conditions without degrading the said mirror surfaces comprising growing an oxide layer on the surface of said device by immersing said device in a first aqueous solution comprising H_2O_2 wherein the pH of the solution is within the range 1.5–3.5, and immersing said device in a second aqueous solution comprising H_2O_2 and an amount of a pH modifier to give a pH of the second solution within the range 6–8.

6. The method according to claim 1 further comprising baking said device subsequent to immersion in the first solu-

tion at successively increasing temperatures up to approximately 150°–350°C for a period of approximately ½ hour to 48 hours.

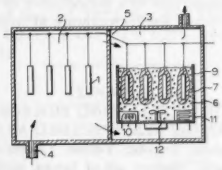
10. The method according to claim **1** further comprising baking said device subsequent to immersion in the second solution at successively increasing temperatures up to approximately 150°–350°C for a period of approximately ½ hour to 48 hours.

3,914,466

METHOD FOR COATING AN ARTICLE

Akihiro Ohkuma, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jan. 22, 1974, Ser. No. 435,577
Int. Cl.² B05D *1/18, 3/00*
U.S. Cl. 427—101 **8 Claims**



1. A method for coating an article with a layer of coating material comprising:

cooling said article to a temperature lower than the freezing point of a chlorofluoro ethane;

providing a suspension of said chlorofluoro ethane as a suspending medium with coating particles of the coating material dispersed therein, the particles being insoluble in the chlorofluoro ethane;

keeping said suspension at a temperature higher than the freezing point of chlorofluoro ethane;

immersing said article in said suspension so as to form a frozen layer of said suspension on the surface of said article by freezing of said chlorofluoro ethane;

taking said article out of said suspension;

removing the chlorofluoro ethane contained in said frozen layer by heating said article at a temperature higher than the boiling point of said chlorofluoro ethane to leave a layer of particles on the article; and

heating the article and the particles remaining on the surface of said article to form a layer of the coating material on the article.

3,914,467

METHOD OF MAKING RESIN ENCAPSULATED ELECTRIC COIL

Masatake Akao, and Kazuo Yamashita, both of Kadoma, Japan, assignors to Matsushita Electric Industrial Company Limited, Kadoma, Japan

Continuation-in-part of Ser. No. 265,297, June 22, 1972, abandoned. This application Apr. 25, 1974, Ser. No. 464,194
Claims priority, application Japan, June 22, 1971, 46-45495; June 22, 1971, 46-45496; June 22, 1971, 46-45497
Int. Cl.² B05D *5/12, 3/02*
U.S. Cl. 427—116 **8 Claims**

1. A method of impregnating and encapsulating an electric coil with a liquid thermosetting resin for enhancement of insulation and protection against external forces, comprising the steps of:

preparing a mixture of 100 parts by weight of a liquid thermosetting resin selected from the group consisting of epoxy resins and unsaturated polyester resins, a curing agent capable of curing the resin at a temperature range between about 80°C and about 200°C and about 1 to about 2 parts by weight of powdered dibenzylidene-D-sorbitol;

heating the mixture to a first temperature between room temperature and about 70°C thereby to lower the viscosity of the resin;

immersing an electric coil in the mixture under vacuum, maintaining the mixture at said first temperature;

heating the mixture to a second temperature higher than said first temperature and between about 60°C and about 90°C thereby to dissolve dibenzylidene-D-sorbitol in the resin and cause the mixture to gel within about 1 minute;

withdrawing the coil from the gelled mixture;

heating the withdrawn coil at a third temperature higher than said second temperature and between about 80°C and about 100°C thereby to half-cure the resin while maintaining the mixture attached to the coil in the gelled state; and

heating the coil at a temperature higher than 100°C thereby to complete the curing of the resin.

3,914,468

METHOD FOR MARKING PAVED SURFACES

John B. Condon, Stillwater, and Thomas L. Harrington, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 29, 1973, Ser. No. 392,531
Int. Cl.² B05D *5/10;* **E01C** *5/00, 11/24*
U.S. Cl. 427—137 **4 Claims**

1. An improved method for marking a paved roadway surface without first severely cleaning the surface comprising

A. coating onto the paved roadway surface a thin bonding layer of liquid coating composition that has a viscosity less than about 1000 centipoises, comprises a film-forming organic bonding material, and (1) readily wets the paved roadway surface, (2) then advances within about 30 seconds to a non-spreading form that is sufficiently free of flammable solvents so that when briefly exposed to an elevated temperature between 150°F and 500°F, it does not char or burn but softens to a tacky condition, and (3) ultimately advances to a tough film that adheres well to the paved surface;

then, within about one hour after completion of step (A),

B. momentarily heating the paved surface and the bonding layer to an elevated temperature;

C. projecting toward the thus-heated bonding layer a marking material that comprises a continuous stream of solid individual organic-based particles that

1. are capable of passing a screen of about 20 mesh, with at least 80 weight percent being retained on a screen of about 200 mesh;
2. are non-tacky, non-blocking, free-flowing, and solid at temperatures up to about 120°F, and
3. comprise (a) a coloring agent in an amount sufficient to color a marking formed from the marking material and (b) an organic thermoplastic phase that accounts on the average for at least about 25 volume-percent of the marking material and that rapidly melts to a low-viscosity condition such that its melt-viscosity is less than about 4000 centipoises at 300°F and less than about 15,000 centipoises at 250°F; and

D. heating the individual particles as they proceed toward the bonding layer to a temperature above 150°F sufficient to at least soften a major portion of the organic thermoplastic phase of the particles before they reach the bonding layer;

the heated condition of the bonding layer and the particles being such that the particles wet and bond to the surface of the bonding layer and coalesce into a film, which subsequently becomes solid, non-tacky, and capable of bearing wheeled road traffic without tracking.

3,914,469

METHOD OF CONTROLLING SOLAR HEAT AND LIGHT IN GREEN HOUSES

Richard Delano, Box 96, and Chad J. Raseman, 15 Blueberry Ridge Road, both of Setauket, N.Y. 11733

Filed Aug. 9, 1972, Ser. No. 278,991

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] B05D *5/00;* **G02B** *13/00;* **A01G** *9/22*

U.S. Cl. 427—164 **11 Claims**

1. A method of controlling the amount of solar heat and light which enters a glass or plastic covered greenhouse or similar enclosure comprising the steps of coating a liquid on the glass or plastic film of the greenhouse, the liquid including a carrier, a finely divided synthetic silica whose average particle size is in the micron range and is less than 10 microns, and a transparent film forming plastic resin, permitting the liquid to dry thereby forming an adherent dry non-transparent coating on the glass or plastic film, and including the further subsequent step of repeatedly permitting the wetting of the said dry non-transparent coating on the glass or plastic surface of said greenhouse with water to make the coating transparent and permitting it to dry between each wetting to make the coating non-transparent.

7. A method of protecting glass or plastic covered greenhouses and similar enclosures from excessive heat consisting of coating the glass or plastic surface of the greenhouse with an adhesive coating, the coating consisting essentially of a synthetic silicon dioxide having an average particle size in the micron range and of less than 10 microns and a transparent film forming plastic resin thereby forming an adherent dry non-transparent coating on the glass or plastic film, and including the further subsequent step of repeatedly permitting the wetting of the said dry non-transparent coating on the glass or plastic surface of said greenhouse with water to make the coating transparent and permitting it to dry between each wetting to make the coating non-transparent.

3,914,470

CAPSULE-CARRYING SHEETS OR WEBS

Benjamin Stanley Lewis, Rhonnda, Wales, assignor to Wiggins Teape Research & Development, London, England

Filed Jan. 29, 1973, Ser. No. 327,790

Claims priority, application United Kingdom, Jan. 31, 1972, 4472/72

Int. Cl. B41c *1/06*

U.S. Cl. 427—202 **11 Claims**

1. A method of producing a capsule-carrying sheet or web comprising a base sheet or web having on a surface thereof a composite coating containing capsules, protective material for protecting the capsules against accidental rupture, and a binder material serving to bind the capsules and protective material to the base sheet or web, comprising the steps of:

a. forming a first coating on a surface of a base sheet or web by applying to the surface an aqueous coating mix consisting essentially of a rewettable binder material and a protective material;

b. drying the first coating;

c. rewetting the dried first coating;

d. forming a composite coating by applying a coating consisting essentially of capsules to the rewetted first coating; and

e. drying the composite coating.

3,914,471

METHOD OF PRODUCING METALLIZED THERMOPLASTIC ARTICLES

Leslie Hamilton Cobb, Harpenden; David Mann, St. Albans, and Timothy Alan Remmington, Hertford, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jan. 25, 1972, Ser. No. 220,683

Claims priority, application United Kingdom, Feb. 9, 1971, 4259/71

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] C23C *13/02*

U.S. Cl. 427—250 **5 Claims**

1. A process for the production of a metallized oriented thermoplastic film, the steps of which consist essentially of vapour depositing a metal layer directly on the surface of an oriented and heat set thermoplastic film and thereafter heating the so-metallized film to a temperature of between 80°C. and 200°C. but below the temperature at which the film has been heat set.

3,914,472

PROCESS FOR METALLIZING THE SURFACE OF A POLYAMIDE RESIN MOLDED ARTICLE

Shigeaki Nakanishi, Toyota; Yoshio Takezawa, Chita, and Akio Yamaguchi, Nagoya, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Oct. 24, 1974, Ser. No. 517,480

Int. Cl. C01d *3/00;* **C23c** *13/02*

U.S. Cl. 427—250 **7 Claims**

1. A process for metallizing the surface of a polyamide molded article which comprises the steps of applying to the surface of the polyamide molded article an undercoat composition obtained by blending about 20 – 95% by weight of an alkyd resin, about 80 – 5% by weight of a methylolurea derivative and about 0 – 10% by weight of an epoxy resin to bring the total amount to 100% by weight, controlling the film to an average thickness of about 5 – 60μ, heat-setting this film and thereafter evaporating a metal on said hardened film.

3,914,473

METHOD OF MAKING A COATED CEMENTED CARBIDE PRODUCT

Thomas Eugene Hale, Warren, Mich., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 147,240, May 26, 1971, Pat. No. 3,736,107. This application Mar. 12, 1973, Ser. No. 339,653

Int. Cl. C23c *11/08*

U.S. Cl. 427—255 **3 Claims**

1. A process of coating a cemented carbide substrate with a fully dense alpha aluminum oxide coating of from 1 – 20 microns thickness comprising

contacting the carbide substrate with (passing an) aluminum halide vapor, water vapor and hydrogen gas (over the carbide substrate) at a temperature of from about 900° – 1250°C., the ratio of water vapor to hydrogen gas being between about 0.025 and 2.0, to form a layer of fully dense alpha aluminum oxide on said substrate.

3,914,474

METHOD OF GILDING SHEETS, NOTABLY FOR MAKING STAMPS

Pierre C. Bletry, and Bernard E. David, both of Paris, France, assignors to Pierre Mariotte S.A., Paris, France

Filed July 2, 1973, Ser. No. 375,864

Claims priority, application France, July 5, 1972, 72.24295

Int. Cl. B44d *1/52*

U.S. Cl. 427—272 **1 Claim**

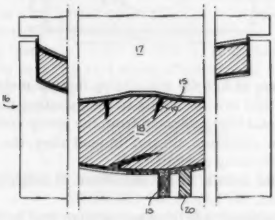
1. A method of manufacturing sheets of stamps comprising relief areas coated with gold powder which alternate with resist-printed areas, comprising depositing through a previ-

ously prepared serigraphic textile screen a mixture of very finely divided gold powder with a binder and a solvent on an offset paper sheet having a glue coated back, repeating this step according to the desired thickness of the gilded areas while allowing the coat to dry between at least two successive passes until a homogeneous metal layer adhering perfectly to the sheet areas to be gilded has been obtained, color-printing the other resist areas of the stamp and imparting the desired luster to the gilded areas by a calendering performed between a rubber-coated cylinder and a carefully ground and polished hardened steel cylinder, said cylinders being urged against each other by an adjustable and constant pressure.

3,914,475
METHOD AND MEANS FOR FORMING COMPOSITE PLASTIC AND WOODEN MEMBERS

Carl A. Napor, 19 Victor Ave., Glen Ridge, N.J. 07028

Filed Jan. 10, 1973, Ser. No. 322,538
Int. Cl. B44d *1/26*; B27k *5/04*
U.S. Cl. 427–291 10 Claims



1. A method of forming a composite article of wood and a polymeric material having a predetermined final shape comprising the steps of:

shaping a wood core member by substantially destroying its structural integrity by partially crushing and cracking the member causing it to take a shape smaller than but generally corresponding to the predetermined final shape;

thereafter repairing the damaged wood core by applying a thermosetting or thermoplastic polymeric material which enters and fills the damaged portions of the wood core without substantially impregnating the core whereby the composite article has a substantial portion of the original strength of the wooden member; and

forming an outer layer of polymeric material of random thickness by applying and hardening the polymeric material on the repaired article thereby completing the shape of the composite article to the said predetermined shape.

3,914,476
METHOD FOR IMPARTING WATER REPELLENCY TO INORGANIC SURFACES

Siegfried Nitzsche; Ewald Pirson, and Michael Roth, all of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed May 22, 1973, Ser. No. 362,714
Claims priority, application Germany, May 23, 1972, 2225013
Int. Cl.[2] B28B *21/94*; B05D *3/10*
U.S. Cl. 427—337 6 Claims

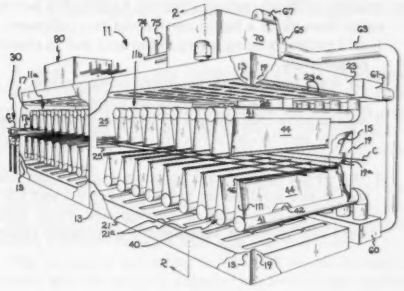
1. An improved method for imparting water repellency to surfaces composed of inorganic substances and containing free lime by impregnating the surfaces with an aqueous solution of an alkali metal organosiliconate, the improvement which comprises applying simultaneously to said surfaces an aqueous solution of an alkali metal organosiliconate and from about 10 to 350 percent by weight based on the weight of the alkali metal organosiliconate in the siliconate solution of an aqueous soluble salt selected from the group consisting of alkali metal carbonates and bicarbonates and ammonium carbonate and bicarbonate.

6. An improved method for imparting water repellency to surfaces composed of inorganic substances and containing free lime by impregnating the surfaces with an aqueous solution of an alkali metal organosiliconate, the improvement which comprises applying from 10 to 350 percent by weight based on the weight of the alkali metal organosiliconate in the siliconate solution of an aqueous soluble salt selected from the group consisting of alkali metal carbonates and bicarbonates and ammonium carbonate and bicarbonate to a surface treated with the alkali metal organosiliconate prior to the complete drying of the organosiliconate solution.

3,914,477
METHOD OF COATING AND DRYING STRANDS

James C. Belue, Sylvania, and Weston C. Jones, Toledo, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 215,355, Jan. 4, 1972, abandoned, which is a division of Ser. No. 822,566, May 7, 1969, Pat. No. 3,680,218. This application Nov. 28, 1973, Ser. No. 419,560
Int. Cl. B44d *1/48*; F26b *13/00*
U.S. Cl. 427—378 6 Claims



1. A method of treating elongate flexible strand material which comprises:

arranging a plurality of individual lengths of said elongate flexible strand material in mutually spaced, parallel, horizontal array,

moving said individual lengths longitudinally while in said array,

applying to said individual lengths a liquid impregnant coating comprising an incompletely cured vulcanizable elastomer, and

subjecting said array of individual lengths while moving to a plurality of alternate, upwardly and downwardly, rapidly moving curtains of heated air, thereby (a) maintaining said lengths in suspended disposition without physical support while subjected to said curtains and (b) drying and partially curing said coating.

3,914,478
METHOD AND COMPOSITION FOR PROTECTING RUBBER AGAINST OXIDATIVE ATTACK UTILIZING UNCURED EPM OR EPDM INTERPOLYMER

Anders H. Johansson, and William C. Bond, Jr., both of Baton Rouge, La., assignors to Copolymer Rubber & Chemical Corporation, Baton Rouge, La.

Filed Nov. 21, 1972, Ser. No. 308,549
Int. Cl.[2] C08J *7/04*
U.S. Cl. 427—385 10 Claims

1. The method for protecting exposed rubber of rubber goods from attack by oxygen, ozone or weathering comprising coating the exposed surface of the rubber goods with a com-

position, the essential ingredient of which consists of an uncured interpolymer of ethylene and at least one alpha-monoolefin having from 3 to 16 carbon atoms (EPM), or ethylene, at least one alpha-monoolefin having from 3 to 16 carbon atoms and a polyene having from 4 to 20 carbon atoms (EPDM) and allowing the coating to dry.

3,914,479

PROCESS FOR MANUFACTURING LEATHER-LIKE MATERIALS

Mineo Yamagata; Akira Akamatsu, and Kazushi Togo, all of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed June 23, 1972, Ser. No. 265,727

Claims priority, application Japan, July 2, 1971, 46-48652

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] D06N *3/00;* **B32B** *5/18;* **B29D** *27/00*

U.S. Cl. 427—390 **7 Claims**

1. A process of preparing a porous, leather-like material which comprises:

a. coating or impregnating a fibrous base with a heterogeneous mixture of a liquid carrier and two polymers,

1. said polymers being a polyamino acid and an elastomer respectively,
2. at least one of said polymers being present in said mixture as a dispersed, separate phase,
3. said mixture containing 2 to 50 percent solid matter by weight, and having a viscosity of 10 to 100,000 centipoises,
4. the weight ratio of said polyamino acid to said elastomer in said solid matter being between 9:1 and 1:9; and

b. drying the coated or impregnated sheet material until said carrier is substantially completely removed.

3,914,480

PROCESS FOR THE PREPARATION OF A FLY FISHING LINE AND THE RESULTING ARTICLE

John L. Lang, 42 Windgate Drive, Box 820-111, Murrysville, Pa. 15668

Continuation-in-part of Ser. No. 242,911, Dec. 7, 1962, abandoned. This application Aug. 21, 1969, Ser. No. 852,095

Int. Cl. B32b *27/02;* **B44d** *5/00*

U.S. Cl. 428—395 **8 Claims**

1. A process for the preparation of a fly-fishing line comprising

a. coating a line core with a mixture comprising (1) a compound selected from the group consisting of isocyanate, diisocyanate, polymeric diisocyanate, carboxylic acid halide, carbamyl halide, ketenes, carbon suboxide, malonic acid, malonyl halide, diacetyl tartaric anhydrides and mixtures thereof; (2) at least one compound having groups reactive with said compounds of (1), selected from the group consisting of alkyl and alkaryl diols, glycerine, pentaerythritol, sugars, polybasic acids, polyamines, aminoacids; and (3) less than 31% (percent by parts of total mixture) of a gelling agent selected from the group consisting of polyacrylamide, polyalkylacrylates, polyalkylmethacrylates, polystryene, polyvinyl toluene, polyolefins, polyvinyl ethers, silica soot, aluminum carboxylates, calcium carboxylates and mixtures thereof;

b. gelling said coating on said line core; and

c. further polymerizing said gelled coating.

3,914,481

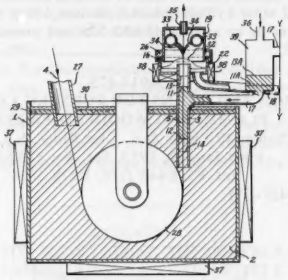
PROCESS OF HOT DIP METALLIZING OF METALLIC ARTICLES

Theodore Bostroem, 460 Park Road Extension, Middlebury, Conn. 06762

Filed Mar. 1, 1973, Ser. No. 337,172

Int. Cl.[2] B05C *3/02*

U.S. Cl. 427—406 **4 Claims**



1. In a process of hot dip metallizing ferrous metal articles by immersing said articles into a molten coating metal bath, said coating metal being selected from the group consisting of zinc, aluminum, cadmium, tin and tin-lead alloy, the improvement which consisting essentially of

a. passing the article to be metallized through a bath of molten lead,

b. conducting the article from said molten lead bath through a confined space containing a layer of the molten coating metal, the surface area of said confined space being a small fraction of the surface area of the lead bath,

c. continually supplying the molten coating metal to said confined space so as to maintain substantially constant the level of the molten coating metal in said confined space, and

d. continually removing the top dross formed on top of the molten coating metal from its surface by overflowing the molten coating metal in said confined space.

3,914,482

DECORATIVE SYNTHETIC RESIN BRAIDING

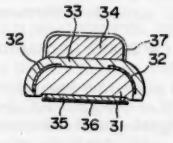
Hiroshi Sawa, Nagoya; Isamu Aratani, Inazawa, and Koji Narita, Nagoya, all of Japan, assignors to Inoue Rubber Company, Ltd., Japan

Filed July 30, 1973, Ser. No. 384,079

Claims priority, application Japan, Aug. 7, 1972, 47-92721[U]; Aug. 7, 1972, 47-92720[U]; Aug. 28, 1972, 47-100100[U]; Oct. 18, 1972, 47-119669[U]; Oct. 18, 1972, 47-119670[U]; Oct. 18, 1972, 47-119671[U]; Nov. 18, 1972, 47-132855[U]

Int. Cl. B32b *5/18;* **B60r** *13/00;* **B32b** *7/08, 15/08*

U.S. Cl. 428—31 **8 Claims**



1. A synthetic resin braiding applicable to the side surface of an automobile body for its protection and decoration comprising a base of rigid plastic having opposite shoulder portions, a pair of spaced apart reflective layers superimposed

and laminated to the base of rigid plastic, one at each shoulder portion thereof, a clear synthetic resin layer superimposed and laminated to the reflective layers, and a protective layer of synthetic resin superimposed and laminated to a portion of the top of the clear layer whereby the clear synthetic layer has a partially exposed surface.

3,914,483
DOUBLE DIE-CUT LABEL

Charles J. Stipek, Jr., Riverside, Ill., assignor to Bates Printing Specialties, Inc., Cicero, Ill.

Filed Feb. 8, 1974, Ser. No. 440,825
Int. Cl.² G09F *3/10*
U.S. Cl. 428—42 **6 Claims**

1. A multiple part label including:
a sheet of paper having indicia on one side thereof,
a coating of a pressure sensitive adhesive on the other side of said sheet of paper,
a backing sheet positioned in contact with said adhesive and having a silicone release agent on its surface contacting said adhesive,
said backing sheet being wholly severed in a configuration having a periphery none of which is located outwardly of the periphery of said sheet of paper, and
at least one inner label formed in said sheet of paper by wholly severing said sheet of paper with said inner label having its periphery located within the periphery of said backing sheet configuration.

3,914,484
PRESSURE SENSITIVE ADHESIVE LABELS AND METHOD OF MAKING

Robert M. Creegan, Chelmsford, and Daniel J. White, Framingham, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Feb. 24, 1971, Ser. No. 118,573
Int. Cl. B32b *7/08;* **G09f** *3/10;* **B32b** *27/40*
U.S. Cl. 428—42 **24 Claims**

1. Pressure sensitive adhesive label sheet stock comprising a layer of pressure sensitive adhesive adhered to a substrate, said pressure sensitive adhesive comprising an elastomer base and a tackifying resin, said elastomer base consisting essentially of a blend of a solid polyurethane elastomer cured on the substrate and one or more normally non-tacky elastomers other than polyurethane elastomer, said polyurethane elastomer being a copolymer of a polyol and an isocyanate which have been applied to said substrate in admixture with said tackifying resin and said one or more non-tacky elastomers without first subjecting them to prepolymerizing temperatures to substantially prepolymerize them and which have been cured in situ on said substrate in the presence of said tackifying resin and said one or more normally non-tacky elastomers, said one or more non-tacky elastomers being selected from the group consisting or natural and synthetic rubbers.

3,914,485
SURFACE COVERING MATERIALS

Ivan Curtis, Maidstone, England, assignor to Marley Tile A.G., Zug, Switzerland

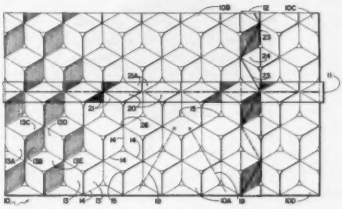
Filed Feb. 20, 1974, Ser. No. 444,000
Int. Cl.² B32B *5/18, 31/14*
U.S. Cl. 428—71 **18 Claims**

1. A process for the production of surface covering materials having a textured effect which comprises the steps of (a) applying at least one resinous composition to a thickness of at least 0.005 inches to selected areas of a substrate; (b) applying one or more overall layers of at least one resinous composition containing a blowing agent and foamable throughout over the substrate and resinous composition thereon; and (c) heating to effect foaming of the foamable resinous composition whereby a surface covering material having a textured effect is produced.

3,914,486
SHEAR FORM STRUCTURES

Skapti Josef Borgford, 1292 Valour Road, Winnipeg, Manitoba, Canada

Filed Mar. 15, 1974, Ser. No. 451,578
Claims priority, application Canada, Mar. 27, 1973, 167540
Int. Cl.² B32B *3/12*
U.S. Cl. 428—73 **8 Claims**



1. A shear form structure comprising a three dimensional core formed from a plurality of hollow, three-sided, half cubes interconnected together along base edges thereof, with alternative apices being perpendicular to and on opposite sides of the central plane of said structure, said apices being flattened to form frustums.

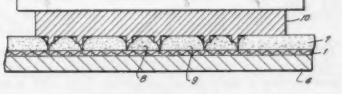
2. The structure according to claim **1** which includes at least one planar skin secured across said apices to enclose at least one side of said core thereby defining a plurality of diagonally extending channels between said skin and said core.

3. The structure according to claim **1** which includes a connector strip for securing adjacent sections of core together said connector strip having a dimensional configuration the same as the configuration of the adjacent edges of the section of core being joined whereby said strip nests upon and engages said adjacent edges, and means to secure said strip to said adjacent edges.

3,914,487
FABRIC WITH DISCRETE SPACED PROJECTIONS OF SYNTHETIC PLASTIC MATERIAL

Claude Azoulay, 6 Rue Alsace Lorraine, 92100 Boulogne, France

Filed Oct. 18, 1973, Ser. No. 409,271
Claims priority, application France, Oct. 23, 1972, 72.37489
Int. Cl. B32b *3/10, 3/14, 3/16*
U.S. Cl. 428—93 **12 Claims**



1. An article of manufacture composed essentially of stretch fabric; and a plurality of discrete spaced anti-skid projections consisting of expanded synthetic plastic foam material bonded to said fabric and projecting from only one surface thereof, said projections having uncovered high-friction faces of said material which are to contact a surface with respect to which

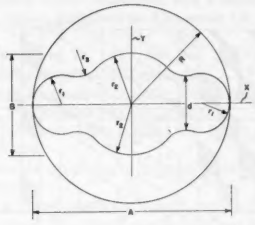
skid protection is to be obtained, whereby the anti-skid characteristic of said stretch fabric and the stretching characteristic of said stretch fabric do not interfere with one another.

3,914,488

POLYESTER FILAMENTS FOR FUR-LIKE FABRICS

Adly Abdel-Moniem Gorrafa, Hockessin, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.

Filed Sept. 24, 1973, Ser. No. 400,037
Int. Cl. D02g *3/00*
U.S. Cl. 428—397 **1 Claim**



1. A polyester filament of 2 to 14 denier having an oblong cross section, continuously along its length, characterized as follows:

a. By major and minor axes of symmetry which are perpendicular to each other;

b. By a ratio of length A to width B, measured along the axes of symmetry, of from 1.4 to 2.4;

c. By a lobe located on each extremity of the major axis which has a tip radius ratio r_1/R of 0.20 to 0.45, where r_1 is the radius of the lobe tip and R is the radius of a circle circumscribed about the oblong cross section;

d. By a lobe located on each extremity of the minor axis which has a tip radius ratio r_2/R of 0.8 to 2.1 times the tip radius ratio r_1/R of the lobes on the major axis;

e. By indentations between the lobes on the major and minor axes; and

f. By the shortest distance d between two indentations on opposite sides of the major axis being from 1.2 to 2.0 times the radius r_1 of the lobes on the major axis.

3,914,489

HIGH PERFORMANCE HOT MELT ADHESIVE BACKSIZING COMPOSITIONS AND CARPET MADE THEREWITH

George Elmer Smedberg, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed Sept. 26, 1974, Ser. No. 509,562
Int. Cl.[2] **D03D** *27/00;* **D04H** *11/00*
U.S. Cl. 428—97 **10 Claims**

1. A composition having a tensile elongation of about 700 to 1500 percent comprising

A. about 15–30 weight percent ethylene/vinyl ester copolymer having a melt index of about 2 to 100, a copolymerized ethylene content of about 67 to 84 weight percent, a copolymerized vinyl ester content of about 16 to 33 weight percent, wherein the acid moiety of said vinyl ester contains 1 to 4 carbon atoms,

B. about 30 to 70 weight percent of one hydrocarbon resin or a mixture of two or more hydrocarbon resins wherein said one hydrocarbon resin or said mixture has a ring and ball softening point of about 50°C. to 70°C. and a viscosity of about 0.5 to 1.5 poise at 135°C.,

C. 0 to about 5 weight percent of an ethylene homopolymer having a molecular weight of about 1500 to 4000, density of about 0.91 to 0.96 g./cm.^{3}, and a melting point of about 220°F. to 270°F.,

D. 0 to about 5 weight percent of a paraffin wax,

E. 0 to about 0.3 weight percent of an antioxidant, and

F. 0 to about 40 weight percent filler.

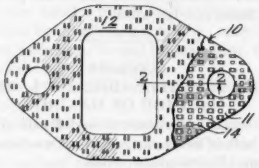
8. A carpet comprised of a primary backing material stitched with closely spaced erect loops of yarn to form a tufted structure, the bottom surface of the tufted structure having as a tuft bonding backsize adhesive coating the composition of claim **7**, said carpet having an average tuft bind of at least 18 pounds.

3,914,490

CERAMIC FIBER GASKET

Michael P. Fusiek, Cicero, Ill., assignor to Dana Corporation, Toledo, Ohio

Filed Aug. 1, 1973, Ser. No. 384,594
Int. Cl. B32b *3/24, 15/14*
U.S. Cl. 428—133 **8 Claims**



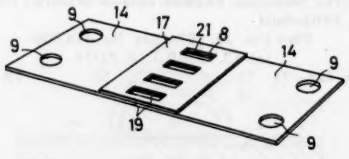
1. A gasket comprising a metal core including perforations defining prongs extending from both sides thereof and a ceramic fiber layer attached to both sides of said core, said layer comprising a mixture of ceramic fibers, an inert and substantially water insoluble filler, Portland cement and a green binder selected from the class consisting of polyvinyl acetate, polyvinyl chloride and neoprene.

3,914,491

FILM SPLICE PATCH

Yoritaro Takahashi, 3-20-1, Chuo, Ohtaku, Tokyo 143, Japan

Division of Ser. No. 391,652, Aug. 27, 1973. This application Sept. 26, 1974, Ser. No. 509,576
Claims priority, application Japan, June 2, 1973, 48-61440; June 2, 1973, 48-61441
Int. Cl.[2] **B32B** *3/10;* **B31F** *5/06*
U.S. Cl. 428—137 **3 Claims**



1. An article of manufacture comprising in combination: a rectangular sheet of protective paper, said sheet having apertures at the four corners thereof and uniformly spaced sprocket holes at the median portion formed widthwise

thereof; and a rectangular sheet of adhesive tape having uniformly spaced sprocket holes therethrough and adhesive material on the bottom thereof, said adhesive tape sheet being positioned in an area between said apertures in a superimposed relationship on said protective paper sheet whereby the sprocket holes of said protective paper sheet coincide with the sprocket holes of said adhesive tape sheet.

3,914,492

SUEDE-LIKE MATERIAL OF CELLULAR RESIN HAVING TENSILE-RUPTURED CELLS

Reuben Wisotzky, Lexington, and Richard E. Petersen, Concord, both of Mass., assignors to Pandel-Bradford, Inc., Lowell, Mass.

Continuation of Ser. No. 108,193, Jan. 20, 1971, Pat. No. 3,709,752, which is a continuation of Ser. No. 661,459, Aug. 17, 1967, abandoned. This application Nov. 3, 1972, Ser. No. 303,476The portion of the term of this patent subsequent to Jan. 9, 1990, has been disclaimed.

Int. Cl.² B32B *3/00, 5/18;* **B29D** *27/00;* **D04H** *11/00*

U.S. Cl. 428—151 **9 Claims**

1. A suede material which comprises: a sheet material and a layer of a cellular thermoplastic resin thereon, the surface of the cellular layer characterized by:

a. an irregular undulating surface;

b. tension-ruptured open cells, said cells having a random, rough, irregular edge structure and generally uniformly composed over the surface; and

c. fibers composed of the thermoplastic resin and of short fiber length to form a fibrous suede surface, the tension-ruptured cells and the short length fibers providing a suede appearance to the surface.

3,914,493

IRON-IN STIFFENING INSERT

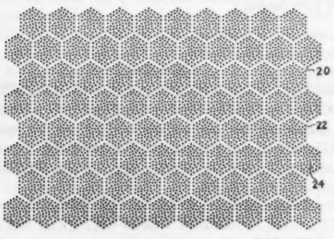
Adolf Gräber, Wald-Ofling, and Kurt Tischer, Hemsbach, both of Germany, assignors to Firma Carl Freudenberg, Weinheim an der Bergstrasse, Germany

Filed Feb. 8, 1973, Ser. No. 330,814

Claims priority, application Germany, Mar. 4, 1972, 2210478; Apr. 15, 1972, 2218375

Int. Cl. B41m *3/00*

U.S. Cl. 428—195 **5 Claims**



1. An iron-in stiffening insert comprising a support carrying a multiplicity of printed dots of adhesive arranged thereon, the spacing between adjacent dots being non-uniform and no more than about 20% greater or lesser than the average spacing between adjacent dots and the average spacing between dots being non-uniform and ranging from about 1 to 2.5 times the average diameter of the dots.

3,914,494

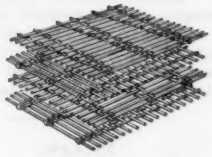
PERVIOUS LOW DENSITY CARBON FIBER REINFORCED COMPOSITE ARTICLES

Im Keun Park, Summit, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 347,594, April 3, 1973, Pat. No. 3,859,158, which is a division of Ser. No. 135,698, April 20, 1971, Pat. No. 3,779,789. This application July 31, 1974, Ser. No. 493,631

Int. Cl.² D03D *15/00*

U.S. Cl. 428—247 **10 Claims**



1. A pervious low density carbon fiber reinforced composite article having a pore volume of approximately 10 to 75 percent by volume of the total composite article, and a bulk density of about 0.4 to 1.4 grams/c.c. comprising:

a. a plurality of superimposed layers of carbon tape of an open weave construction comprising a plurality of adjacent substantially parallel and laterally spaced linear warp ends of a carbonaceous fibrous material containing at least 90 percent carbon by weight substantially coextensive with the length of said tape wherein no substantial lateral contact is made between said adjacent warp ends, and a fibrous weft pick containing at least 90 percent carbon by weight interlaced with said warp ends in a plain weave construction at a frequency of about 2 to 8 picks per inch of said tape with said weft pick being provided under a tension sufficient that said linear configuration of said warp ends is substantially unimpaired, and

b. a substantially cured thermosetting resinous material in intimate association with said plurality of superimposed layers of carbon tape in a concentration of about 20 to 50 percent by weight based upon the total weight of said composite article wherein lateral interstices are substantially maintained between said adjacent warp ends within a given layer of said tape of said composite article.

3,914,495

FIRE RETARDANT INSULATING TAPE WRAP

Anthony R. Lania, Watertown; Edward L. Chase, Brockton; Francis M. Chase, Cohasset; Leonard P. Graham, Canton, and James E. Murray, Norwood, all of Mass., assignors to Chase Corporation, Randolph, Mass.

Division of Ser. No. 274,496, July 24, 1972, Pat. No. 3,745,233. This application Apr. 25, 1973, Ser. No. 354,369

Int. Cl.² B32B *17/04*

U.S. Cl. 428—255 **4 Claims**

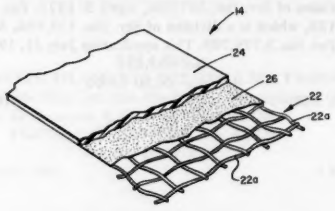
3. Bedding and binding tape comprising

A. a sheet or strip of open weave glass fiber scrim,

B. a thin, continuous polyethylene terephthalate film coextensive with the scrim, and

C. a thin adhesive coating on the film bonding the film to the scrim, said adhesive coating being comprised of one

of a group consisting of polyurethane adhesive, acrylic adhesive, an adhesive based on acrylic-polyvinyl chloride



copolymers and an adhesive based on a copolymer of carboxyl-modified acrylonitrile-budadiene.

3,914,496

ANTISTATIC FINISHING OF SURFACES

Helmut Jorek; Rolf Fikentscher, both of Ludwigshafen; Joachim Kurze, Leutershausen, all of Germany, and Herbert Heifert, Trenton, Mich., assignors to Basf Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 1, 1974, Ser. No. 447,228

Int. Cl.² C08J *1/44*

U.S. Cl. 428—279 **2 Claims**

1. Fibrous material provided with an antistatic finish with 0.03 to 2 per cent by weight, based on the fibrous material, of at least one ammonium salt of the formula

$$\left[Q-\overset{\oplus}{\underset{R}{N}}(CH_2-CH_2-OH)_2 \right] X^{\ominus}$$

where $X^{\ominus}$ is one equivalent of an anion of a water-soluble acid, Q is hydroxyalkyl of 2 or 3 carbon atoms, alkyl of 1 to 6 carbon atoms, benzyl or the radical

$$\left[-A-\underset{R}{N}(CH_2-CH_2-OH)_2 \right] X^{-}$$

A is alkylene of 2 to 6 carbon atoms and R is hydroxyalkyl of 2 or 3 carbon atoms, alkyl of 1 to 6 carbon atoms or benzyl.

3,914,497

NON-WOVEN BATTS POSSESSING EXCELLENT TENSILE STRENGTH, TEAR STRENGTH AND INITIAL MODULUS

Hiroshi Kanehira, Kurashiki, and Syozi Kurosaki, Okayama, both of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Sept. 11, 1973, Ser. No. 396,136

Claims priority, application Japan, Sept. 14, 1972, 47-72427

Int. Cl.² B32B *5/28*; D04B *1/58*

U.S. Cl. 428—288 **4 Claims**

1. A non-woven batt having high tensile strength, high tear strength and high initial modulus, which comprises a batt of isotactic polypropylene substrate fibers bonded together by means of an ethylene-propylene random copolymer wherein the ethylene content of said ethylene-propylene random copolymer is from 4 to 6 mole percent and is present in the approximate proportion of 5 to 75 weight percent relative to the weight of said isotactic polypropylene substrate fibers.

3,914,498

RESILIENT FELTED FIBROUS WEB

Otis R. Videen, St. Paul, Minn., assignor to Conwed Corporation, St. Paul, Minn.

Continuation-in-part of Ser. No. 119,702, March 1, 1971, abandoned. This application Feb. 12, 1973, Ser. No. 331,803

Int. Cl. D04h *1/64*; B32b *5/16*

U.S. Cl. 428—290 **6 Claims**

1. A web of felted water absorbent natural cellulosic fibers having a density not over about six pounds per cubic foot having enhanced resiliency imparted by absorption in the individual fibers of a resinous material comprising a resole phenol formaldehyde in which the major proportion of resinous material at the time of absorption is a resole phenol formaldehyde which is water soluble at infinite dilution in water and neutral pH, said resole phenol formaldehyde resin being cured and set in the individual fibers to enhance the resilience of the web.

3,914,499

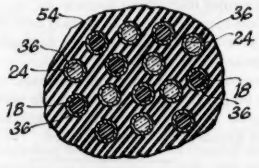
FIBER REINFORCED ELASTOMERS

August C. Siefert, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed May 10, 1972, Ser. No. 251,881

Int. Cl.² B32B *3/14*; D02G *3/00*; D04H *3/16*

U.S. Cl. 428—292 **12 Claims**



1. In a fiber-reinforced elastomeric product wherein an elastomeric material constitutes a continuous phase in which the fibers are distributed, the improvement wherein the fiber reinforcement comprises a bundle of a substantially uniform blend of elongate continuous glass fibers and organic fibers formed from a fiber-forming organic material in which the fibers have been blended as they are formed, each of the glass and organic fibers having a thin film coating on the surfaces thereof formed from an anchoring agent selected from the group consisting of an organo silicon compound and a Werner complex compound.

3,914,500

TUNGSTEN WIRE REINFORCED SILICON NITRIDE ARTICLES AND METHOD FOR MAKING THE SAME

John J. Brennan, Portland; Richard C. Novak, Glastonbury, and Michael A. De Crescente, Wethersfield, all of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Sept. 4, 1973, Ser. No. 394,433

Int. Cl. B32b *5/02*

U.S. Cl. 428—295 **6 Claims**

1. An impact resistant fiber-reinforced composite article suitable for use in a gas turbine engine environment comprising a plurality of continuous tungsten wires preferentially oriented in a hot-pressed Si_3N_4 matrix, which approaches full densification, each of said wires having a layer of tungsten silicide thereon, said tungsten silicide layer being chemically bonded to said wires and said matrix and said matrix being in compression as a result of said bond.

3,914,501

POROUS PRODUCTS AND PROCESSES THEREFOR

Walter A. Miller, Somerville, N.J., and Richard D. Jenkinson, Naperville, Ill., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 837,302, June 27, 1969, abandoned. This application May 17, 1973, Ser. No. 361,149

Int. Cl.² B32B 5/08; D04H 3/14

U.S. Cl. 428—296 1 Claim

1. A porous sheet-like structure comprising:

A. Forming shaped articles by melt extruding with drawing an immiscible fiber forming polymer mixture, wherein at least one polymer of said mixture is converted to an extractable fiber and at least one other polymer of said mixture is converted to a non-extractable fiber having a cross-sectional diameter normal to its elongated shape of less than about five microns;

B. Forming said shaped articles into an unbonded sheet;

C. Heating said sheet made in (B) to a temperature whereby to interfuse substantially all of the non-extractable fibers therein sufficient to unite all of the fibers in the sheet;

D. Extracting as a solution at least a portion of the extractable fibers from said sheet in an amount sufficient to have said sheet possess moisture vapor transmission; and

E. Separating the solution from the sheet in an amount to produce a porous sheet possessing moisture vapor transmission and containing the ultrafine, thermoformable, molecularly oriented nonextractable fibers therein, which nonextractable fibers are interbounded by fusion at a plurality of points where such nonextractable fibers interconnect, and said fibers define open and unfilled pores which are interconnected and extend from surface to surface of said sheet, and said fibers have a cross-sectional diameter normal to their elongated shape end less than about 5 microns.

3,914,502

HEAT-ADHESIVE LAMINATED FILM

Ikuya Hayashi; Keiichi Uno, and Mikio Matsuoka, all of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Continuation-in-part of Ser. No. 435,925, Jan. 23, 1974. This application Mar. 27, 1974, Ser. No. 455,110

Claims priority, application Japan, Feb. 2, 1973, 48-13956

Int. Cl.² B32B 15/08, 27/36, 27/34, 27/28

U.S. Cl. 428—336 11 Claims

1. A heat-adhesive laminated film comprising (1) a base film selected from the group consisting of (a) a plastic film made from a polyester, polyamide or polycarbonate which is in a form of non-oriented film, uniaxially oriented film or biaxially oriented film and (b) a metal foil made from aluminum or copper and (2) a film of a resin comprising predominantly block copolyester selected from the group consisting of polyethylene terephthalate/polytetramethylene oxide block copolymer, polytetramethylene terephthalate/polytetramethylene oxide block copolymer, polyethylene terephthalate isophthalate/polytetramethylene oxide block copolymer and polytetramethylene terephthalate·isophthalate/polyeteramethylene oxide block copolymer, which has a melting point of (a) greater than 180°C but at least 20°C. lower than the melting point of the plastic film if the base film (1) is a plastic film or (b) greater than 180°C. but no more than about 300°C. if the base film (1) is a metal foil, and which has a Young's modulus (ϵ) and a breaking elongation ($\Delta l/lo \times 100$) when measured at 20°C. and 130°C. of

10^7 dyne/cm² $< \epsilon < 10^{10}$ dyne/cm² and

$(\Delta l/lo) \times 100 > 40\%$

said film of a resin (2) being laminated on at least a single side of said base film (1).

3,914,503

FLAME RETARDED CARPET UNDERLAY

Jasper H. Brown, East Alton, Ill.; John A. Cooper, Manchester, Mo., and Albert W. Morgan, Collinsville, Ill., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 18, 1974, Ser. No. 524,581

Int. Cl.² B32B 3/26

U.S. Cl. 428—315 14 Claims

1. A flame retarded carpet underlay composition comprising a laminate of a foamed polyurethane and a polyolefin film, said foamed polyurethane containing a salt of a carboxylic acid and a metal selected from zinc, antimony, tin and copper and a beta-haloethyl phosphate.

3,914,504

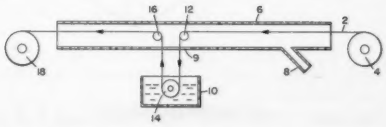
SIZED CARBON FIBERS

Winfred E. Weldy, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Oct. 1, 1973, Ser. No. 402,493

Int. Cl.² B44D 1/092

U.S. Cl. 428—367 4 Claims



1. A carbon fiber having coated on the surface thereof from about 0.4 to about 5.0% by weight, based on the weight of the fiber of a sizing composition selected from the group consisting of polyglycidyl ethers, cycloaliphatic polyepoxides and mixtures thereof.

3,914,505

PHENOLIC SOLUTIONS OF IMIDE-AMIDE POLYMERS

Maurice Ducloux, Irigny, and Max Gruffax, La Mulatiere, both of France, assignors to Rhone-Poulenc, S.A., Paris, France

Filed Oct. 15, 1973, Ser. No. 406,461

Claims priority, application France, Oct. 16, 1972, 72.36574

Int. Cl.² B05D 7/20; C08K 5/09, 5/13; C09D 3/70

U.S. Cl. 428—379 9 Claims

1. A low-viscosity composition which comprises an imide-amide polymer dissolved in a phenolic solvent which comprises at least one phenol having a melting point below 50°C., and a saturated or ethylenically unsaturated carboxylic acid with up to 6 carbon atoms selected from formic acid, acetic acid, propionic acid, butyric acid, acrylic acid, crotonic acid and methacrylic acid in an amount from 0.1 to 50% by weight based on the weight of polymer and solvent.

9. A metal wire coated with a composition as defined in claim 1.

EAS JG

3,914,506

WELDING MATERIAL FOR AUSTENITIC STAINLESS STEELS

Yasuhiro Nishio, Saiki; Takashi Ohmae, and Yasuyuki Yoshida, both of Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 29, 1973, Ser. No. 374,966

Claims priority, application Japan, July 10, 1972, 47-68826; July 10, 1972, 47-68827; July 31, 1972, 47-76593

Int. Cl. B23k 35/24

U.S. Cl. 428—385 3 Claims

1. In a welding material for austenitic stainless steel with a chemical composition effective to produce a deposited metal having the following composition:

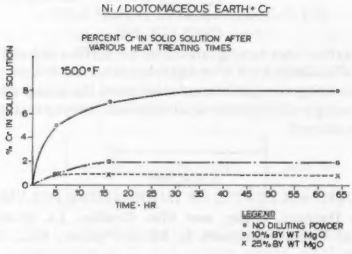
not more than 0.15% C, 15.0 – 30.0% Cr, 8.0 – 40.0% Ni,
not more than 2.5% Mn,
not more than 1.5% Si,
not more than 3.0% Mo,
not more than 0.045% P,
not more than 0.030% S,
not more than 0.030% Nb, and
not more than 5% ferrite,
the improvement which comprises said material having an amount of TA effective to produce a Ta content in the deposited metal of 0.40 – 3.0%.

3,914,507

METHOD OF PREPARING METAL ALLOY COATED COMPOSITE POWDERS

David A. W. Fustukian, Edmonton, Canada, assignor to Sheritt Gordon Mines Limited, Toronto, Canada

Continuation-in-part of Ser. No. 122,098, March 8, 1971, abandoned. This application Nov. 20, 1973, Ser. No. 417,689
Claims priority, application Canada, Mar. 20, 1975, 077934
Int. Cl.² B22F *1/02*
U.S. Cl. 428—404 **18 Claims**


Ni / DIOTOMACEOUS EARTH + Cr
PERCENT Cr IN SOLID SOLUTION AFTER VARIOUS HEAT TREATING TIMES
1500°F
% Cr IN SOLID SOLUTION
TIME - HR
LEGEND
• NO DILUTING POWDER
o 10% BY WT MgO
x 25% BY WT MgO

1. A process for producing powder particles having a central core coated with an alloy which comprises the steps of: providing finely divided particles of an alloying metal and composite particles of a size within the range of 10 to 850 microns, said alloying metal being chosen from the group consisting of chromium and a mixture of chromium and aluminum, each said composite particle having a central core coated with a layer of material which is metallic, which is different from the material of the core and which is capable of alloying with said alloying metal when a mixture of said compositve particles and said alloying metal particles is heated; forming a powder mixture which consists of said composite particles and said alloying metal particles; and heating said powder mixture under non-oxidizing conditions at a temperature of from about 1650°F to about 2300°F; and continuing said heating step for a period of time sufficient to ensure that a required quantity of said alloying metal diffuses into and alloys with the metal coating of the composite particles without gross sintering taking place.

14. A powder composition comprising non-grossly sintered particles within the size range of 10–850 microns and each consisting essentially of single central core chosen from the group consisting of diatomaceous earth, graphite and calcium fluoride, a continuous coating firmly bonded to the core, said coating comprising an alloy in the form of a solid solution of at least two constituents, one constituent being chosen from the group consisting of chromium and aluminum.

3,914,508

COATING FOR PROTECTING A CARBON SUBSTRATE IN A MOIST OXIDATION ENVIRONMENT

Norris A. Hooton, and Norman E. Jannasch, both of South Bend, Ind., assignors to The Bendix Corporation, South Bend, Ind.

Continuation-in-part of Ser. No. 123,403, March 11, 1971, abandoned. This application Jan. 18, 1973, Ser. No. 324,624
Int. Cl. C23c *1/00*
U.S. Cl. 428—408 **9 Claims**

1. A carbon friction lining having a selected surface with a coating thereon for protecting an underlying carbon friction lining from oxidizing in a moist atmosphere at temperatures ranging from 1200° – 2500°F., said coating comprising:

a first material selected from the group consisting of Boron, Boron Oxides, Boron Carbides, Boron Nitride and other Boron compounds in which Boron comprises at least 25% of the compound weight, said selected material comprising from 10–60 weight per cent of the initial total coating;

a second material selected from the group consisting of Chromium, Vanadium, Molybdenum, Niobium, Tungsten, Tantalum, and oxides of these elements in which said elements comprise at least 50% of the oxides weight, said selected modifier material comprising from 10–85 weight per cent of the initial total coating; and

a carbonizable resin comprising from 5–50 weight per cent of the initial total coating, said carbonizable resin forming a matrix bond with said carbon friction lining to hold the selected first material and the second material adjacent to the selected surface upon being charred up to a temperature of 2000°F. in a non-oxidizing atmosphere, said first and second selected materials reacting mutually with oxygen in an oxidizing atmosphere to form a water insoluble oxide surface through which the penetration of oxygen is inhibited.

3,914,509

CHEMICAL MODIFICATION OF THE SURFACE OF PYROLYTIC GRAPHITE

Howard G. Tennent, Kennett Square, Pa., assignor to Hercules Incorporated, Wilmington, Del.

Filed Nov. 20, 1973, Ser. No. 417,686
Int. Cl.² C25B *11/14, 11/18*
U.S. Cl. 428—408 **7 Claims**

1. The process of chemically modifying the surface of pyrolytic graphite which comprises (a) hydrogenating the surface to terminate peripheral carbon atoms with hydrogen, and (b) mercurating the hydrogenated surface by contacting said surface with a solution of a mercury (II) salt selected from the group consisting of mercuric acetate, nitrate and perchlorate in an acidic reaction medium selected from the group consisting of acetic, acetic-perchloric, trifluoroacetic and methane sulfonic acids and mixtures of said acids with the anhydrides thereof to replace some of the terminating hydrogen atoms with mercury (II)-containing groups and thus to chemically bond mercury to some of the peripheral carbon atoms of the graphite surface.

3,914,510

THERMAL SENSITIVE TRANSPARENCY

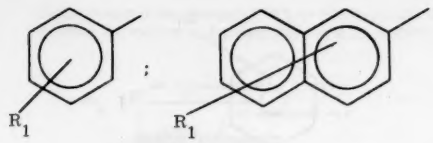
Kenneth D. Glanz, and David B. McQuain, both of Appleton, Wis., assignors to NCR Corporation, Dayton, Ohio

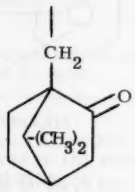
Continuation-in-part of Ser. No. 263,569, June 16, 1972, abandoned. This application Mar. 20, 1974, Ser. No. 452,880
Int. Cl.² B41M *5/12, 5/18*
U.S. Cl. 428—411 **18 Claims**

1. A thermal-sensitive transparent film comprising a transparent film substrate coated with (a) a base coating comprising a binder, a crosslinking agent for the binder, and at least one sulfonic acid represented by the formula

$$R—SO_3H$$

wherein R is:



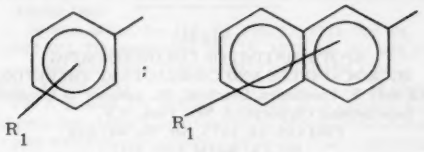


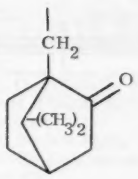
wherein R_1 is the radical —OH, —Cl, —CH_3, —NO_2 or —SO_3H, wherein the binder is crosslinked, and wherein the sulfonic acid and the binder of the base coating have a ratio of the sulfonic acid to the binder ranging from 1:5 to 3:1, and (b) a surface coating comprising a binder which is soluble in volatile organic solvents and at least one colorless, but colorable chromogenic compound selected from the group consisting of: 3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-decyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-chloro-3,3′-spirobi [3H-naphtho [2,1-b] pyran; 2,2′-trimethylene-3,3′-spirobi [3H-naphtho [2,1-b] pyran; 2-n-amyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2,2′-trimethylene-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2,2′-trimethylene-2′′-methyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-n-heptyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-isobutyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-methyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-ethyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; spiro [2H-1-benzopyran-2,3′-[3H]-naphtho [2,1-b] pyran]; 2′-isopropyl-spiro [2H-1-benzopyran-2,3′-[3H]-naphtho [2,1-b] pyran]; 2′-methyl-spiro [2H-1-benzopyran-2,3′-[3H]-naphtho [2,1-b] pyran]; 2,2′-spirobi [2H-1-benzopyran]; 3,3′-trimethylene-2,2′-spirobi [2H-1-benzopyran]; 2,3-diphenyl-7-methoxy spiro [4H-1-benzopyran-4,3′-[3H] naphtho [2,1-b] pyran]; 2-phenyl-3-methylspiro [4H-1-benzopyran-4,3′-[3H] naphtho [2,1-b] pyran]; 2,2′-spirobi [2H-naphtho [1,2-b] pyran]; 2-(2,5-dichloroanilino)-2-(p-methoxyphenyl-2(H) benzopyran); 1′,3′,3′-trimethyl-8-methoxy spiro [2H-1-benzopyran-2,2′-indoline]; 1,3,3-trimethylspiro [indoline-2,3′-[3H]-naphtho [2,1-b] pyran]; 1,3,3-trimethylspiro [indoline-2,3′-[3H]-naphtho [2,1-b]-1,4-oxazine]; 3,3-bis (p-dimethylamino phenyl)-6-dimethylamino phthalide; 3,3-bis (1-ethyl-2-methylindol-3-yl) phthalide; 2′-anilino-6′-diethylamino-3′-methylfluoran; 2′-methoxy-6′-dimethylaminofluoran; and 1′,3′,4′-trimethyl-6′-diethylaminofluoran wherein the chromogenic compound and the binder of the surface coating have a ratio of the chromogenic compound to the binder ranging from 1:8 to 3:1, wherein the chromogenic compound is reacted with the sulfonic acid on heating to form color wherein the base, coating is sandwiched between the transparent film and the surface coating, and wherein the binder of the base coating is insoluble in the volatile organic solvents.

11. A process for producing a thermal-sensitive transparent film consisting essentially of sequentially:

a. providing a transparent film;

b. coating the transparent film with a wet base coating having a thickness ranging from 1 to 10 mils wherein the wet base coating comprises, by weight, 2.0 to 10.0 percent of at least one sulfonic represented by the formula R—SO_3H wherein R is:





wherein R_1 is the radical —OH, —Cl, —CH_3, —NO_2 or —SO_3H, 3.0 to 10.0 percent of a binder, 0.25 to 3.0 percent of a cross-linking agent for the binder, and 80.0 to 85.0 percent water or alcohol;

c. thoroughly drying the wet base coating and crosslinking the binder;

d. coating the dried base coating with a wet surface coating having a thickness ranging from 1 to 10 mils wherein the wet surface layer comprises, by weight, 2.0 to 10.0 percent of at least one colorless, but colorable chromogenic compound selected from the group consisting of: 3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-decyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-chloro-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2,2′-trimethylene-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-n-amyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2,2′-trimethylene-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2,2′-trimethylene-2′′-methyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-n-heptyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-isobutyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-methyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; 2-ethyl-3,3′-spirobi [3H-naphtho [2,1-b] pyran]; spiro [2H-1-benzopyran-2,3′-[3H[-naphtho [2,1-b] pyran]; 2′-isopropyl-spiro [2H-1-benzopyran-2,3′-[3H]-naphtho [2,1-b] pyran]; 2′-methyl-spiro [2H-1-benzopyran-2,3′-[3H[-naphtho [2,1-b] pyran]; 2,2′-spirobi [2H-1-benzopyran]; 3,3′-trimethylene-2,2′-spirobi [2H-1-benzopyran]; 2,3-diphenyl-7-methoxy spiro [4H-1-benzopyran-4,3′-[3H] naphtho [2,1-b] pyran] ; 2-phenyl-3-methyl-spiro [4H-1-benzopyran-4,3′-[3H] naphtho [2,1-b] pyran]; 2,2′-spirobi [2H-naphtho [1,2-b] pyran]; 2-(2,5-dichloroanilino)-2-(p-methoxyphenyl-2(H) benzopyran); 1′,3′,3′-trimethyl-8-methoxy spiro [2H-1-benzopyran-2,2′-indoline]; 1,3,3-trimethylspiro [indoline-2,3′-[3H]-naphtho [2,1-b] pyran]; 1,3,3-trimethylspiro [indoline-2,3′-[3H]-naphtho [2,1-b]-1,4-oxazine]; 3,3-bis (p-dimethylamino phenyl)-6-dimethylamino phthalide; 3,3-bis (1-ethyl-2-methylindol-3-yl) phthalide; 2′-anilino-6′-diethylamino-3′-methyl-fluoran; 2′-methoxy-6′-diethylaminofluoran; and 1′,3′,4′-trimethyl-6′-diethylaminofluoran, 3.0 to 15.0 percent of a binder which is soluble in volatile organic solvents and 75.0 to 95.0 percent of a volatile organic solvent; and

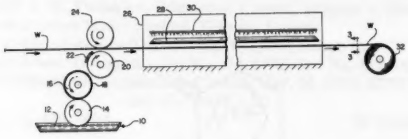
e. thoroughly drying the wet surface coating, wherein the binder of the base coating is insoluble in the volatile organic solvents and wherein the chromogenic compound is reacted with the sulfonic acid on heating to form color.

3,914,511

SPOT PRINTING OF COLOR-FORMING MICROCAPSULES AND CO-REACTANT THEREFOR

Anthony E. Vassiliades, Deerfield, Ill., assignor to Champion International Corporation, New York, N.Y.

Filed Oct. 18, 1973, Ser. No. 407,654
Int. Cl.² B41M *5/00, 5/12*
U.S. Cl. 428—411 **16 Claims**



1. A process for the production of a pressure sensitive sheet having a local coating of microcapsules thereon, which comprises passing a web continuously between a first roll and a second roll, said first and second rolls being partially in nip-defining relation, said first roll being an impression roll and said second roll being a printing roll, said printing roll being a roll having only a portion of its surface coated with a resilient material to provide a raised, resilient printing head on said second roll, said nip being formed between said first roll and the coating surface of said raised, resilient printing head, said coating surface of said printing head being provided with a coating of microcapsules prior to passage of said printing head through said nip, and thereby forming a coating of microcapsules on said web as it passes through said nip in a configuration corresponding to said printing surface of said printing head, said microcapsules containing a chromogenic material and being capable of withstanding pressures of up to 50 psi without rupturing, and passing said coated web to a drying zone wherein said microcapsular coating is dried.

12. A pressure sensitive copy system comprising a transfer sheet having a surface thereof provided with a local coating consisting essentially of pressure-rupturable microcapsules in a predetermined configuration on only a portion of said surface, said microcapsules containing a chromogenic material and being capable of withstanding pressures of up to **50** psi without rupturing.

3,914,512

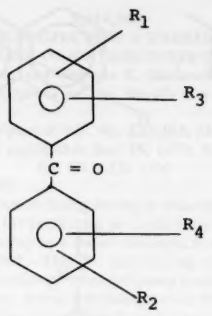
POLYEPOXY RESIN-DIARYL DIANHYDRIDE LAMINATING RESINS AND LAMINATES

Walter P. Barie, Jr., Shaler Township, and Norman W. Franke, Penn Hills Township, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Nov. 29, 1972, Ser. No. 310,412
Int. Cl.² C03C *25/00;* **B44D** *1/09;* **C09D** *3/48*
U.S. Cl. 428—413 **4 Claims**

1. A formable, handleable lamina of resin-impregnated reinforcing material capable of being cured to a clear hard reinforced resin which comprises a sheet of fibrous reinforcing material impregnated with a homogeneous mixture of

1. a nonplasticizing 1,2-epoxy resin which contains on the average more than one 1,2-epoxy group per molecule, and
2. an anhydride hardener component comprising
   a. from about 15 to 100 weight percent of a diaryl dianhydride having the structural formula



where R_1 and R_2 are the anhydride groups; and where R_3 and R_4 are monovalent radicals selected from hydrogen, an alkyl group having between one and five carbon atoms, and a halogen; and

   b. up to about 85 percent of a nonplasticizing monoanhydride,

said homogeneous mixture having an A/E ratio of between about 0.4 and about 1.0 and being substantially free of any non-reacting solvent.

3,914,513

SUBSTRATES COATED WITH FIRE RESISTANT COMPOSITIONS

Alistair Chalmers Ramsay Brown, and Denis George Harold Ballard, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 309,920, Nov. 27, 1972, abandoned, which is a continuation of Ser. No. 735,561, June 10, 1968, abandoned. This application Nov. 20, 1973, Ser. No. 417,606
Claims priority, application United Kingdom, June 15, 1967, 27732/67
Int. Cl. D21h *1/28*
U.S. Cl. 428—425 **2 Claims**

1. A coated product comprising a flammable substrate coated with a mixture of (1) a polyolefin selected from the group consisting of polyethylene and polypropylene (2) from 10–20% by weight of a flame retardant additive comprising a mixture of chlorinated paraffin wax and antimony oxide and (3) from 40–45% by weight of an intumescent material comprising a mixture of pentaerythritol polyurethane with melamine phosphate, said mixture being self-extinguishing and free from drip of molten polyolefin when a direct flame is applied thereto.

3,914,514

TERMINATION FOR RESISTOR AND METHOD OF MAKING THE SAME

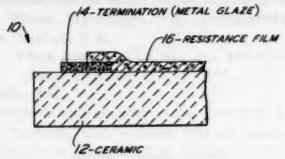
George D. MacKenzie, Maple Glen, Pa., and Michael G. Noblett, Ventnor, N.J., assignors to TRW, Inc., Cleveland, Ohio

Filed Aug. 16, 1973, Ser. No. 388,734
Int. Cl.² B05D *5/12*
U.S. Cl. 428—426 **7 Claims**

1. A method of making a termination for refractory metal glaze resistors comprising the steps of:

a. applying to the surface of a substrate a mixture of a glass frit and particles of a compound taken from the group consisting of ruthenium oxide, iridium oxide, rhodium oxide, and mixtures thereof, the metal oxide particles

being present in the amount of 79% to 99% by weight and
b. firing the mixture at a temperature of at least 900°C in

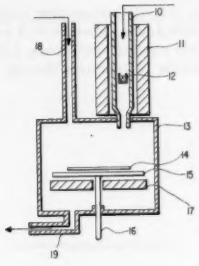


a non-oxidizing atmosphere until the compound dissociates to form and sinter the metal.

3,914,515
PROCESS FOR FORMING TRANSITION METAL OXIDE FILMS ON A SUBSTRATE AND PHOTOMASKS THEREFROM

James Kane, Affolter am Albis, and Hanspeter Schweizer, Zurich, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed July 16, 1973, Ser. No. 379,552
Int. Cl.² B32B *17/06;* **C23C** *11/08;* **C03C** *17/22;* **B29B** *11/00*
U.S. Cl. 428—432 **5 Claims**



1. A process for preparing a photomask which comprises
a. vaporizing solvent-free dicyclopentadienyl iron at a temperature from about 100°–140°C.,
b. heating a transparent substrate to a temperature of about 300°–550°C.,
c. contacting the heated substrate with the vaporized dicyclopentadienyl iron in an oxygen-containing atmosphere so as to deposit a film of iron oxide on the substrate to a thickness of from about 500–5,000A, and
d. forming a pattern in the iron oxide film by removing selected portions thereof.

3,914,516
SUN PROTECTION GLASS

Elmar Ritter, Vaduz, Liechtenstein, assignor to Balzers Patent und Beteiligungs AG, Liechtenstein

Filed Oct. 19, 1973, Ser. No. 408,112
Claims priority, application Switzerland, Nov. 28, 1972, 017352/72
Int. Cl.² G02B *5/22;* **B32B** *17/06*
U.S. Cl. 428—432 **4 Claims**

1. A sun protection glass comprising an absorption-free base glass, and a light-absorbing thin vacuum vapor deposited layer of a mixture of a non-metallic embedding material of low absorption with metal as absorption substances composed of a mixture of magnesium fluoride, chromium and silver, said layer containing 350 to 500 parts by weight magnesium fluoride, 75 to 100 parts by weight chromium and 10 to 50 parts by weight silver.

3,914,517
METHOD OF FORMING A CONDUCTIVELY COATED CRYSTALLINE GLASS ARTICLE AND PRODUCT PRODUCED THEREBY

Perry P. Pirooz, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 118,201, Feb. 23, 1971, Pat. No. 3,802,892. This application Dec. 19, 1973, Ser. No. 426,378
Int. Cl.² C03B *32/00;* **C03C** *17/00;* **B44D** *1/02*
U.S. Cl. 428—433 **14 Claims**

10. A process for forming a coated glass ceramic body wherein the coating is an in situ coating of conductive metallic copper which process comprises thermally in situ crystallizing a glass body having a composition consisting essentially of in weight percent the stated compounds in the stated percentages, said composition being selected from the group consisting of:

A. 25–35% SiO_2, 5–13% Al_2O_3, 3–9% CaO, 0–7% MgO, 10–20% Na_2O, 0–10% K_2O, wherein the sum of Na_2O + K_2O is 15–25%, 15–25% TiO_2, 0–5%, ZrO_2, 3–7% CuO and 1–5% BaO;
B. 40–50% SiO_2, 15–25% Al_2O_3, 10–20% Na_2O, 0–5% K_2O, wherein the sum of $Na_2O + K_2O$ is 15–20% 10–15% TiO_2 and 3–7% CuO; and
C. 40–50% SiO_2, 20–30% Al_2O_3, 1–10% TiO_2, 3–7% CuO, 5–8% MgO, 0–8% ZrO_2 and wherein the sum of TiO_2+ ZrO_2 is at least 6%,

wherein copper ions migrate to the surface of said body during said thermal in situ crystallization, and
heating the body in reducing atmosphere for a period of time sufficient to form a conductive layer of metallic copper thereon.

11. A coated crystallized glass body having in situ formed metallic copper coating on its surface and produced by the process of thermal in situ crystallization of a glass body and the heating of the resulting crystallized glass body in a reducing atmosphere, said glass composition consisting essentially of in weight percent the stated components in the stated percentages, said composition being selected from the group consisting of:

A. 25–35% SiO_2, 5–13% Al_2O_3, 3–9% CaO, 0–7% MgO, 10–20% Na_2O, 0–10% K_2O, wherein the sum of Na_2O + K_2O is 15–25%, 15–25% TiO_2, 0–5% ZrO_2, 3–7% CuO, and 0–5% BaO;
B. 40–50% SiO_2, 15–25% Al_2O_3, 10–20% Na_2O, 0–5% K_2O, wherein the sum of Na_2O + K_2O is 15–20%, 10–15% TiO_2, and 3–7% CuO; and
C. 40–50% SiO_2, 20–30% Al_2O_3, 1–10% TiO_2, 3–7% CuO, 5–8% MgO, 0–8% ZrO_2, and wherein the sum of TiO_2 + ZrO_2 is at least about 6%.

3,914,518
BARRIER COATED CELLULOSIC SUBSTRATES

Vernon Charles Haskell, Richmond, Va., assignor to E. I. Du Pont de Nemours & Company, Wilmington, Del.

Filed May 22, 1974, Ser. No. 472,421
Int. Cl.² B32B *27/06;* **C01B** *25/36*
U.S. Cl. 428—451 **19 Claims**

1. In a shaped article comprising a water-sensitive regenerated cellulose substrate having coated on at least one surface thereof a moisture and oxygen barrier coating consisting essentially of aluminum orthophosphate, iron orthophosphate, or a vinylidene chloride copolymer applied from an organic solvent, the improvement wherein increased moisture and oxygen barrier properties can be obtained, which improvement consists in said substrate surface being first impregnated with about 0.15 to 1.5 g./m.² of an alkali metal silicate wherein the mole ratio of SiO_2 to alkali metal oxide is from about 1.6 to 4.6.

3,914,519

PROCESS AND COMPOSITION FOR COATING METALS

Wilbur S. Hall, Plymouth Meeting, and Lester Steinbrecher, Southampton, both of Pa., assignors to Amchem Products, Inc., Ambler, Pa.

Division of Ser. No. 152,992, June 14, 1971, Pat. No. 3,776,848, which is a continuation-in-part of Ser. No. 791,801, Jan. 16, 1969, Pat. No. 3,585,084, which is a continuation-in-part of Ser. No. 554,336, June 1, 1966, abandoned. This application Dec. 3, 1973, Ser. No. 421,259

Int. Cl.[2] B05D *5/08*, *7/14*

U.S. Cl. 428—457 13 Claims

1. A method for applying a lubricating coating to a metallic surface comprising: applying to said surface an acidic aqueous coating composition consisting essentially of, in coating-forming amounts and as essential ingredients, an organic non-resinous coating-forming lubricant dispersed in the aqueous phase of the coating composition, at least about 0.01 oxidizing equivalent per liter of an oxidizing agent which contains oxygen and at least about 2 g/l of fluoride ion.

3,914,520

METHOD FOR PLATING OF PLASTIC

Ralph James Hovey, Glen Ellyn, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation-in-part of Ser. No. 131,428, April 5, 1971, abandoned. This application Mar. 16, 1973, Ser. No. 342,100

Int. Cl. B44d *1/092*

U.S. Cl. 428—458 8 Claims

1. A method of plating metal on a polyamide plastic surface having absorbed moisture, which comprises removing under evaporative conditions at least a portion of the absorbed moisture to provide a dry surface, heating the plastic in an aqueous impregnating solution of a catalytic material at an elevated temperature of at least 100°F. to impregnate the surface with the catalytic material, treating the impregnated surface with an aqueous solution of a reducing agent to activate said catalytic material, and electrolessly depositing metal on the activated surface.

3,914,521

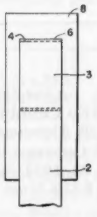
HEAT-TREATED, CORONA-TREATED POLYMER BODIES AND A PROCESS FOR PRODUCING THEM

Theodore R. Beatty, Bay Village, and Harry Vourlis, Lakewood, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 1, 1974, Ser. No. 456,877

Int. Cl.[2] H05B *7/16*; B32B *27/32*, *15/08*

U.S. Cl. 428—461 13 Claims



1. A process for producing a composite material of a polymer body adhesively secured to a substrate comprising the steps:

a. heating a polymer body to above about 40°C. and below the melting temperature of said polymer body;

b. subjecting said heat-treated body to a corona discharge at an energy density-to-film surface of at least 9 watt-minutes/ft.[2] to improve the affinity of a surface of said polymer body for adhesives; and

c. securing said heat-treated, corona-treated polymer body to a substrate with an adhesive to form a composite material thereof.

10. A composite material made in accordance with the process of claim 1.

3,914,522

POLYOLEFIN-COATED PHOTOGRAPHIC CARRIER MATERIAL

Eckehard Sliverin, and Jorg Zimmermann, both of Osnabrück, Germany, assignors to Felix Schoeller, Jr., Germany

Filed Feb. 20, 1974, Ser. No. 444,045

Claims priority, application Germany, Feb. 22, 1973, 2308711

Int. Cl.[2] G03C *1/87*

U.S. Cl. 428—513 20 Claims

1. A polyolefin coated photographic carrier paper receptive to hydrophilic substances, wherein said polyolefin is coated with a crystallized coating comprising calcium, magnesium, zinc or lead fluoride or mixtures thereof, silicic acid and a matting agent.

3,914,523

AMINOPLAST RESIN MODIFIED WITH METHYLENE BISFORMAMIDE AND LAMINATED THERMOSETTING DECORATIVE SHEETS

Karl Schnee, Dornigheim; Steffen Piesch, Oberursel, and Dieter Tichy, Frankfurt am Main, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 294,953, Oct. 4, 1972, abandoned. This application Jan. 15, 1974, Ser. No. 433,525

Claims priority, application Germany, Oct. 7, 1971, 2149970

Int. Cl.[2] B32B *21/08*, *23/08*, *27/42*

U.S. Cl. 428—528 6 Claims

1. A laminated thermosetting decorative sheet, the decorative top layer of which is impregnated with a thermohardened, modified aminoplast resin which is the condensation product of an aminoplast constituent and a carbonyl compound having added thereto, either before, during or after said condensation, 0.5 to 40% by weight, based on the solids content of the finished modified resin and calculated as methylene bisformamide, of at least one member selected from the group consisting of methylene bisformamide and the methylolation products thereof.

3,914,524
HIGH AMYLOPECTIN STARCH ADHESIVE COMPOSITION AND ADHESIVE TAPE

Robert W. Monte, Merrimack, N.H., assignor to Nashua Corporation, Nashua, N.H.

Filed July 1, 1974, Ser. No. 484,596
Int. Cl.² B32B 23/04; C08L 3/12
U.S. Cl. 428—533 5 Claims

1. An adhesive tape suitable to be wound as a roll without premature bonding and without loss of adhesive strength which comprises a paper backing having coated on one surface thereof an adhesive composition comprising:

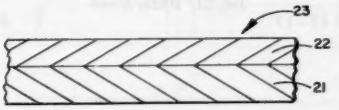
(1)	a starch high in amylose pectin;	
(2)	a medium molecular weight starch having a molecular weight of from 20,000 to 50,000	in an amount of from 2.0 to 10.0 wt.%,
(3)	urea	in an amount from 1.5 to 6.0 wt.%;
(4)	a component selected from the group consisting of sugar or sugar alcohol	in an amount from 5.0 to 10.0 wt.%;
(5)	a neutralized polyacrylate having a molecular weight of from 450,000 to 600,000	in an amount of 1.0 to 6.0 wt.%; and
(6)	water	in an amount from 4.0 to 6.0 wt.%

wherein the weight percents are based upon the weight of amylose pectin.

3,914,525
MERCURY SULFIDE FILMS AND METHOD OF GROWTH

Michael F. Ehman, Mission Viejo, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 15, 1974, Ser. No. 451,653
Int. Cl.² H01L 3/00; H01M 15/02
U.S. Cl. 428—539 5 Claims



1. A method of forming a layer of monocrystalline hexagonal mercury sulfide on a monocrystalline substrate, comprising:

forming a melt above the HgS transition temperature of 344°C, said melt consisting of about 0.15–0.20 mole of HgS and 0.85–0.80 mole of Na_2S_4;

lowering the temperature of said melt to saturate said melt with respect to HgS;

inserting a monocrystalline substrate into said melt, said substrate being stable in said melt and having a deposition surface; and

cooling said melt further to supersaturate with respect to the HgS to precipitate HgS out of the melt and form a monocrystalline layer of hexagonal HgS on the deposition surface of said substrate.

3,914,526

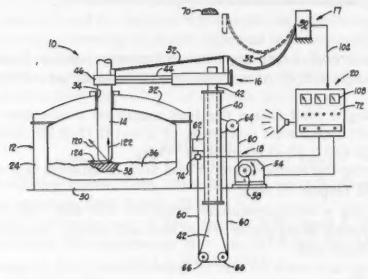
FORCE SENSING CONTROL APPARATUS AND METHOD FOR ELECTRIC ARC FURNACES

Kegham M. Markarian, University Heights; Richard D. Matty, Marshallville; Thomas W. Maloney, Cleveland, and Thomas E. Moore, Canton, all of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 421,582, Dec. 4, 1973, abandoned. This application Oct. 8, 1974, Ser. No. 513,128

Int. Cl.² H05B *7/144*

U.S. Cl. 13—13 **6 Claims**



4. In an electric arc furnace system:

a. an electrode system comprising an electrode projecting into a furnace along an axis and electrode support structure supported for movement relative to said furance in directions parallel to said axis;

b. drive means for movably positioning said electrode system relative to said furnace;

c. force sensing means cooperating with said electrode system for detecting changes in forces applied to said electrode system, said force sensing means producing force signals which vary at least as a function of changes in the direction and magnitude of the components of detected force changes acting parallel to said axis; and,

d. force responsive control means for said drive means comprising:

i. a control means actuable to terminate operation of said drive means in a direction to move said electrode system away from said furnace; and,

ii. a force responsive control signal means producing a signal for actuating said control means in response to detection of a predetermined force signal value created by an obstruction to movement of said electrode system away from said furnace.

3,914,527

LINING FOR ZINC POT INDUCTION HEATER

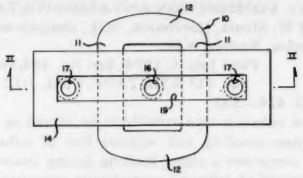
Carl E. Osterholtz, Steubenville; Edward Agostinelli, Martins Ferry, and Edward Jagucki, St. Clairsville, all of Ohio, assignors to Wheeling-Pittsburgh Steel Corporation, Pittsburgh, Pa.

Filed Mar. 28, 1974, Ser. No. 455,645

Int. Cl.² F27D *1/10*

U.S. Cl. 13—30 **6 Claims**

1. In an induction heating unit for molten metal having a core of magnetizable material, electrical windings thereon and a refractory lining defining a molten metal path surrounding the windings, the improvement comprising a composite refractory lining comprising a unitary prefabricated refractory bushing surrounding the electrical winding, a unitary prefabricated refractory channel surrounding the bushing but spaced



therefrom, and a cast-in-place refractory mass filling the space between the bushing and the channel.

3,914,528

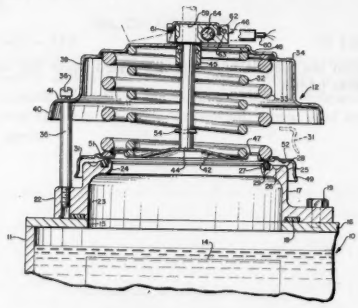
PRESSURE RELIEF DEVICE FOR POWER TRANSFORMER

Wendell D. Johnson, Rochester, N.Y., assignor to Qualitrol Corporation, Fairport, N.Y.

Filed Mar. 20, 1974, Ser. No. 452,845

Int. Cl.² H01F *27/08*

U.S. Cl. 174—11 R **2 Claims**



1. The combination comprising an electrical power transformer including a tank having an opening in its top wall and containing cooling fluid in which a transformer element is immersed; a pressure relief device having an annular supporting body mounted to the wall of the tank over the opening, the supporting body having an upper annular end wall defining an upper opening coaxial with the opening of the tank, a gasket ring seated in the end wall about the upper opening and protruding slightly above the level of the end wall, a disk valve seated upon the gasket in coaxial relation thereto and to the upper opening, yieldable spring means arranged coaxially with the valve pressing the valve in sealing seated relation upon the gasket, the valve extending radially beyond the gasket in overlying spaced relation to the end wall and having a peripheral flange depending in the seated condition of the valve in closely spaced surrounding relation to the supporting body, an annular crown cover mounted atop the supporting body in coaxial relation to the valve and in elevated spaced relation thereto, the cover providing an abutment to an upper end of the spring means, a plastics pin extending axially of the cover having a bottom end resting upon a central area of the valve and disposed with its opposite end through a bushing fitted in an axial aperture of the cover, the valve being movable axially against the spring means from the gasket in response to a predetermined pressure rise within the tank, the pin being movable through the bushing beyond the cover with the axial movement of the valve; and an electrical alarm switch having

a housing block mounted atop the cover provided with a hole registering with the pin through which hole the pin is movable, the block being confined within the peripheral bounds of the cover, a magnet disposed in the block, a pair of switch contacts disposed in the block, a steel plate overlying the hole being hinged at one end to the block and having a lip at its opposite end depending in a normal condition in a slot between the magnet and the contacts, the magnet being adapted upon removal of the lip from the slot to activate the contacts, and the steel plate being pivotable to lift its lip from the slot upon projection of the plastics pin against the steel plate in moving through the hole.

3,914,529

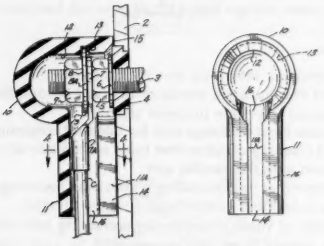
INSULATIVE TERMINAL CAP

Norman C. Holloway, Box 267, Chesire, Oreg. 97419

Filed July 10, 1974, Ser. No. 487,277

Int. Cl.² H01R *13/44*

U.S. Cl. 174—5 R **2 Claims**



1. An insulative cap for flexed engagement with an output terminal of a welder and an attached electrical cable fitting, said terminal including a circular element spaced outwardly from the front wall surface of the welder, said cap comprising, an elastomeric head portion of hollow construction for reception of the terminal and defining on its interior an internal groove for seated engagement about the periphery of the circular element in place on the welder terminal, said head portion having a frontal edge, a tubular neck portion integral with said head portion bifurcated along one side to provide lengthwise extending opposed neck walls with each of said neck walls diverging in opposite directions to define a relieved neck wall area adjacent the inner wall of the cap head portion, said head and neck walls adapted to flex outwardly to receive the circular terminal element and the cable fitting during installation with the relieved area defined by the neck walls admitting the cable fitting.

3,914,530

BEARING FOR THE SUPPORT OF THE INNER CONDUCTOR OF AN ENCAPSULATED TUBULAR LINE SUPPORT IN A SUPPORT INSULATOR

Rolf Dürschner, Mohrendorf, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 29, 1974, Ser. No. 501,744

Claims priority, application Germany, Sept. 18, 1973, 2347003

Int. Cl.² H01B *9/04*

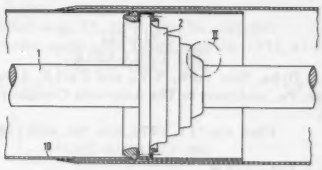
U.S. Cl. 174—28 **10 Claims**

1. A bearing for the support of the inner conductor of an encapsulated, gas-insulated tubular transmission line, the bearing being in a support insulator extending between the inner conductor and the encapsulation which support insulator includes a control electrode comprising:

a. a split annular bearing having at least two holes therein located between the control electrode and the inner conductor;

b. at least first and second conductive parts in said holes;

c. a contract spring connecting said first and second electrical conductive parts, said contact spring resting against the control electrode and causing said conductive parts to



rest against said inner conductor whereby an electrical connection is established between said inner conductor and said control electrode through said conductive parts and said contact spring.

3,914,531

POWER ISOLATED TRANSMISSION CABLE ASSEMBLY

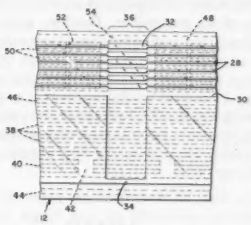
Dale Richard Zell, Elizabethtown, and John Leroy Martin, Hummelstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 29, 1974, Ser. No. 456,346

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H01B *7/08*

U.S. Cl. 174—36 **9 Claims**



1. A matched impedance and isolated power circuit cable assembly comprising:

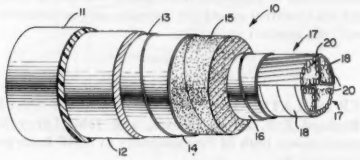
at least two flat flexible cables arranged in stacked configuration, each of said cables comprising a flat flexible insulating substrate, circuitry on both sides of said substrate, and insulation covering said circuitry;

one of said cables having a plurality of flat, parallel, spaced apart signal conductors lying in a single plane on a first side of said substrate and a plurality of interconnected flat shield conductors lying in a single plane on the other side of said substrate, said shield conductors extending parallel to said signal conductors and being laterally offset therefrom, said shield conductors having a width which is no greater than the spacing between said signal conductors whereby the edge portions of said shield conductors do not overlap edge portions of said signal conductors;

the other of said cables having on a first side of said substrate a plurality of flat, parallel, spaced apart signal conductors and a single flat, wide ground conductor both lying in a single plane, and on the other side of said substrate at least one power conductor of a first rating, at least one power conductor of a second rating, said power conductors aligned opposite and parallel to said single ground conductor, single flat isolating conductors lying in the same plane as and to each side of said power conductors, and a plurality of interconnected flat shield conductors lying in a single plane extending parallel to and laterally offset from said signal conductors;

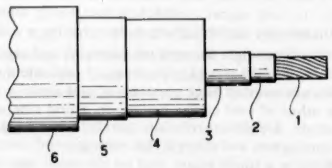
sheating means enclosing said flexible cables;
terminal means attached to opposite ends of said cable assembly;
said cables being stacked with said first sides adjacent one another.

3,914,532
SECTOR CABLE
John J. Dyba, New York, N.Y., and Carl F. Ackerman, New Hope, Pa., assignors to The Anaconda Company, New York, N.Y.
Filed Apr. 11, 1974, Ser. No. 460,126
Int. Cl.² H01B 7/02
U.S. Cl. 174—119 R **3 Claims**



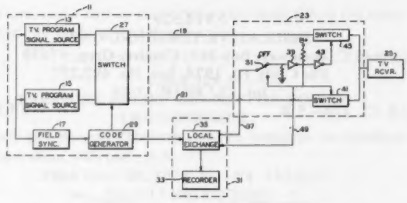
1. A sector cable comprising a plurality of wedge-shaped segments, composed of a plurality of compacted and twisted wire strands, arranged with side walls abutting and with the point of each wedge directed toward, but spaced from, the central axis of the cable, at least alternate segments covered on the exterior with an insulation covering comprising at least two layers of an extensible, flexible, and dense uncreped paper, the insulated and uninsulated segments being so spaced in relation to each other that the side wall of any uninsulated segment does not abut the side wall of any other uninsulated segment, the innermost insulation layer is wrapped around the segments with about a 5% butt space between the edge of the layer and at least one outer layer being applied over the innermost layer with approximately 50% intercalation of said at least one outer layer.

3,914,533
ELECTRIC TELECOMMUNICATION CABLE HAVING AN AXIAL CARRIER CORE
Jacques Bendayan, Lyon, France, assignor to Les Cables de Lyon, Lyon, France
Filed Feb. 25, 1974, Ser. No. 445,761
Claims priority, application France, Feb. 23, 1973, 73.06595
Int. Cl.² H01B 5/00, 11/00
U.S. Cl. 174—126 CP **2 Claims**



1. An electric telecommunication cable comprising an axial carrier core made of steel wires on which is welded a central conductor consisting of a composite metal strip having an external face made of copper and an internal face made of a metal which readily adheres to steel, said metal strip being bent to form a cylinder and its edges which are situated opposite to each other being welded longitudinally, the metals of said external and internal faces of said composite metal strip being mechanically and electrically connected.

3,914,534
METHODS AND APPARATUS FOR SCRAMBLING AND UNSCRAMBLING PREMIUM TELEVISION CHANNELS
F. Douglas Forbes, Palos Verdes Peninsula, Calif., assignor to The Magnavox Company, Fort Wayne, Ind.
Filed Oct. 29, 1973, Ser. No. 410,677
Int. Cl.² H04N 1/44
U.S. Cl. 178—5.1 **18 Claims**



1. A subscriber television system comprising:
a central unit having a source of first and second field synchronized television program signals;
at least one local exchange unit for bilateral communication with a plurality of subscriber units and unilateral communication with the central unit;
each subscriber unit including a television receiving device and a subscriber control unit coupled thereto;
a plurality of video channels for conveying television program signals from said central unit to each subscriber unit;
said central unit including means for selectively connecting at least one television program source to a first preselected channel for a first time period and to a second channel for a second time period, said central unit further including means for signalling a status of said connecting means to each of said local exchange units, and;
means included within each subscriber control unit to supply said at least one television program signal to the corresponding television receiving device from said first preselected channel for said first time period and from said second channel for said second time period, said supply means controlled by signals from said associated local exchange unit.

3,914,535
RECEIVER FOR A STILL PICTURE BROADCASTING SIGNAL
Teruhiro Takezawa, Komae; Michio Masuda, Tokyo; Hiroaki Nabeyama; Katsuo Mohri, both of Yokohama; Masaaki Fukuda, Kodaira; Tatsuo Kayano, Hachioji; Takashi Uehara, Inagi; Eiichi Sawabe, Machida; Takehiko Yoshino, Yokohama; Hisakichi Yamane, Tokyo, and Akio Yanagimachi, Kawasaki, all of Japan, assignors to Hitachi Limited; Hitachi Electronics, Ltd. and Nippon Hoso Kyokai, all of Tokyo, Japan
Filed Aug. 30, 1973, Ser. No. 393,163
Claims priority, application Japan, Sept. 4, 1972, 47-87958
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H04N 5/44
U.S. Cl. 178—5.8 R **5 Claims**

1. A receiver for receiving a composite signal including a first information signal, a second information signal and a control signal having information for processing above said two signals in the receiver being transmitted sequentially in a predetermined sequence, wherein during transmission period of said second information signal the signals to be reproduced

in the same period are inserted in the composite signal as real signals, and signals to be reproduced in the period when said second information signal is not transmitted are inserted in the composite signal as memory signals, and for reproducing said second information signal, the receiver comprises;

a means for generating a signal for identifying real or memory of said signal and for selectively deriving the same,

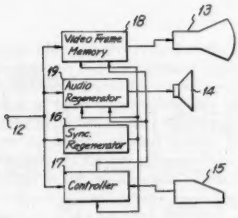
a gate means to be controlled by an output signal of said signal generating means,

a means for memorizing selectively gated out memory signal by said gate means,

a means for directly reproducing said selectively gated out real signal gated by the gate means simultaneously with the reception, and

a means for reading out said memory signal stored in the memory means during the period in which the second information signal is not transmitted and for reproducing the memory signal to form a continuous signal together with said reproduced real signal.

3. A receiver for reproducing audio signal from a composite signal comprising a video signal, a time division multiplex audio signal, a control signal including information for processing said two signals in the receiver, and synchronizing signals required for reproducing said signals, being transmitted in a predetermined time interval and in a predetermined sequence, during the transmission period of the audio signal the audio signal to be reproduced in the same period said audio signal is transmitted as a real signal, and the audio signal to be reproduced during a period in which the audio signal is not transmitted is transmitted as memory signal and transmitted together with the real signal in the composite signal, the receiver comprises;



a means for selecting said control signal,

a means for deriving out said audio signal by using the selected control signal by the selecting means,

a means for identifying real or memory of the derived out audio signal by said means,

a gate means for selectively switching the memory signal and the real signal in the derived out audio signal by using an output signal of said identifying means,

a means for memorizing said selected memory signal selected by the gate means,

a means for immediately reproducing the selected real signal selected by the gate means, and

a means for reading out the memorized memory signal in the memory means during the period in which the audio signal is not transmitted and reproducing the read out memory signal in continuous with the real signal.

3,914,536

IDENTIFIER FOR A PULSE CODE MODULATED SIGNAL

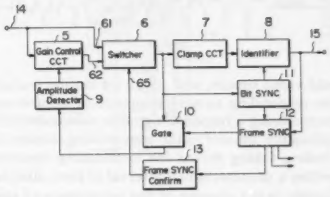
Katsuo Mohri, Yokohama; Michio Masuda, Tokyo; Teruhiro Takezawa, Komae; Hiroaki Nabeyama; Takehiko Yoshino, both of Yokohama, and Takashi Uehara, Inagi, all of Japan, assignors to Hitachi Limited and Nippon Hoso Kyokai, both of Tokyo, Japan

Filed Aug. 27, 1973, Ser. No. 391,867

Claims priority, application Japan, Aug. 30, 1972, 47-86276

Int. Cl.[2] H04N *5/04*

U.S. Cl. 178—5.8 R **8 Claims**



1. An identifier for identifying a pulse code modulated signal in a composite signal incuding a video signal and a pulse code modulated audio signal, said video and audio signals being alternately transmitted in a predetermined sequence, said video and audio signals having a pulse coded synchronizing signal inserted in said video and audio signals with a predetermined repetition frequency, said pulse coded synchronizing signal including a predetermined number of pulses synchronized with pulses which form a pulse code of said pulse code modulated audio signal, comprising:

a gain control circuit having an input to which is applied the composite signal for controlling gain thereof, said control circuit including an output for the gain controlled composite signal;

a means for deriving a pulse series including a signal component having a frequency equal to said repetition frequency of said pulse coded synchronizing signal from said composite signal and for producing a continuous pulse signal synchronized with said pulses which form the pulse code;

a means for detecting an amplitude of said pulse coded synchronizing signal and for providing an output signal having a voltage proportional to the detected amplitude; a means for controlling gain of said gain control circuit and for reducing variation of an amplitude of said composite signal by applying the output signal of the amplitude detecting means to said gain control circuit; and

a means for identifying the gain controlled composite signal of the output of said gain control circuit, said identifying means including means for responding to the continuous pulse signal synchronized with said pulses which form the pulse code and for shaping a waveform of said gain controlled composite signal so as to obtain a complete pulse train signal.

3,914,537

FACSIMILE COMMUNICATION SYSTEM

Donald A. Perreault, Pittsford; Victor Lee Bedzyk, Fairport; Larry Richard Matthews, Victor; Roy Wilben Rivers, Conesus; David Rollin Shuey, Webster, and John David Torpie, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 253,827, May 16, 1972. This application Aug. 27, 1973, Ser. No. 391,693

Int. Cl.[2] H04N *1/32, 1/36*

U.S. Cl. 178—6 **3 Claims**

1. A facsimile transmission system having a transmitting station and a receiving station, said transmission station adapted for line scanning graphic information which is to be transmitted to said receiving station and for forming a video

signal therefrom for transmission, said receiving station adapted for receiving and detecting the video components of said signal and for line scanning a record medium to form a graphic image in accordance with information contained in the video signal and conforming to the image at said transmitting station, the improvement comprising:

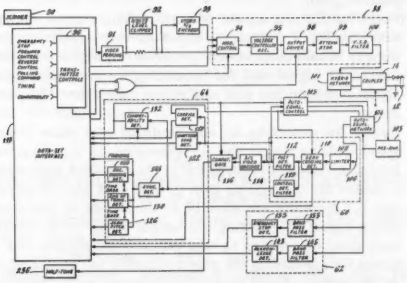
said transmitting station including means for generating a sequence of control signals preceding the transmission of

said video signals, said receiving station including means for responding to said sequence of control signals, and transmitting a response signal to said transmitting station indicative thereof, said transmitting station further including timing means for terminating operation thereof within a predetermined interval of time after said control signals in the absence of the occurrence of said response signal.

3,914,538
FACSIMILE COMMUNICATION SYSTEM

Donald A. Perreault, Pittsford; Victor Lee Bedzyk, Fairport; Larry Richard Matthews, Victor; Roy Wilben Rivers, Conesus; David Rollin Shuey, Webster, and John David Torpie, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 253,827, May 16, 1972. This application Aug. 27, 1973, Ser. No. 391,696
Int. Cl.[2] H04N *1/32*, *1/36*
U.S. Cl. 178—6 **6 Claims**



1. In a facsimile communication system, including a transmitter and receiver, said transmitter being adapted for line scanning graphic information which is to be transmitted and form a signal for transmission to said receiver at which the graphic material is reproduced, said transmitter including first means for generating a composite signal comprising components transmitted in sequence for conditioning said receiver prior to receipt of a video signal, said first means further including second means for generating a carrier signal having a demodulation amplitude indicative of the scan rate of said transmitter, third means for generating a plurality of equalizing signals of a preselected amplitude for providing a preselected reference indicative of the distortions in transmission, fourth means connected to said second and third means for generating a plurality of periodically recurring blanking signals, said blanking signals gating said second and third means between adjacent line scans of said transmitter whereby selected ones of said components correspond to the demodulated amplitude of said carrier signal indicative of the scan line pitch at said transmitter and selected other ones of said components correspond to said equalizing signals.

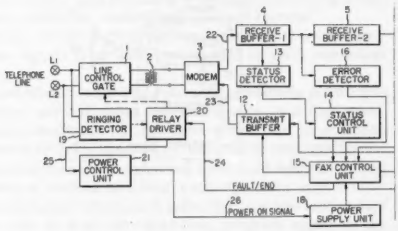
6. In a facsimile communication system having a transmitting and receiving stations, said transmitting station adapted for line scanning graphic information which is to be transmitted to said receiving station and for forming a video signal therefrom, the improvement comprising:

means included in said transmitting station for automatically feeding each of the documents in a stack of documents to a scanning station for transmission of the markings thereon to said receiving station, and means included in said transmitting station for generating a command signal for transmission to said receiving station indicative of the transmission of a last of the documents in said stack and means in said transmitting station for generating a periodically recurring blanking signal between successive line scans, segments of said blanking signal forming synchronizing signals and said command signal indicative of the transmission of a last document in said stack, said command signal being delayed with respect to said synchronizing signal.

3,914,539
AUTOMATIC RECEPTION SYSTEM FOR FACSIMILE RECEIVER

Takemi Hashimoto, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Dec. 28, 1973, Ser. No. 429,148
Claims priority, application Japan, Dec. 31, 1972, 47-301
Int. Cl.[2] H04N *1/22*
U.S. Cl. 178—6 **10 Claims**



1. Automatic facsimile reception system comprising

a. means adapted to detect a call signal transmitted through a telephone subscriber line;

b. line connection control means adapted to establish a DC closed loop over said subscriber line in response to the detection of a call signal by said call signal detecting means;

c. receiver means adapted to receive video information transmitted through said DC closed loop from a transmitter;

d. recording means adapted to reproduce pictures or images upon a recording paper based upon said video information received by said receiver means;

e. memory means adapted to store therein said video information received by said receiver means;

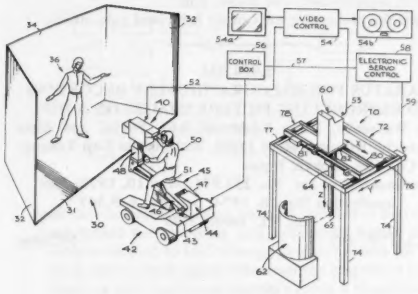
f. switching means adapted to selectively switch the video information received by said receiver means to said recording means or to said memory means by selectively connecting said receiver means to said recording means or to said memory means; and

g. malfunction control means adapted to cause said switching means to connect said receiver means to said memory means in response to the occurrences of a selected malfunction of said recording means while said recording means is reproducing the pictures or images based upon the video information.

3,914,540
OPTICAL NODE CORRECTING CIRCUIT

Dan Slater, Fullerton, Calif., assignor to Magicam Inc., Santa Monica, Calif.

Filed Oct. 3, 1974, Ser. No. 511,742
Int. Cl.² G03B 41/00; H04N 5/24
U.S. Cl. 178—6.8 6 Claims



1. In a compsite photography system of the registered matte type having foreground and background cameras and objects constituting a reference frame for each camera in a scene in the field of view of each camera, the size of objects in the background scene being on a scale substantially different from that of objects in the foreground scene, mounting means supporting each camera for movement about a pivotal point whereby a change in the perspective of each scene may be viewed by its respective camera, the nodal points of the foreground camera and of the background camera being respectively displaced by predetermined distances from their pivotal points, and the cameras being coupled for synchronizing the movement of the background camera with movement along X, Y, and Z-axes and pan and tilt of the foreground camera means for maintaining the perspective with which the background camera views its scene synchronized with the perspective with which the foreground camera views its scene during pan and tilt movements of the foreground camera comprising means at said foreground camera for generating pan and tilt signals, respectively representative of pan and tilt motion thereof,

means responsive to said signals representative of foreground camera pan and tilt motion for generating first correctional signals representative of the displacement of the nodal point of said background camera from its pivotal point in response to said foreground camera pan and tilt signals,

means responsive to said foreground camera pan and tilt signals for generating second correctional signals representative of the displacement of said foreground camera nodal point from its pivotal point in response to said foreground camera pan and tilt motion,

means for scaling said second correctional signals in accordance with a predetermined scaling factor,

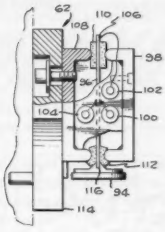
means for adding said first and second scaled correctional signals to produce resulting correctional signals, and

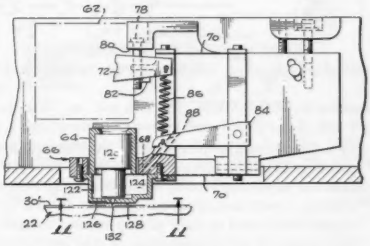
means responsive to said resulting correctional signals for moving the nodal point of said background camera to a nodal point location which, relative to the scene being viewed by said background camera, is identical with the nodal point location of the foreground camera relative to the scene being viewed by said foreground camera.

3,914,541
VIDEO DISC PLAYER

James E. Elliott, Los Angeles, Calif., assignor to MCA DiscoVision, Inc., Universal City, Calif.

Filed Dec. 11, 1972, Ser. No. 314,082
Int. Cl.² H04M 1/22; G11B 21/00
U.S. Cl. 178—6.6 R 3 Claims





1. A player for retrieving information recorded on video discs comprising in combination:

disc drive means for imparting rotational velocity to the disc;

player arm means coupled to said disc drive means for moving radially with respect to the rotating disc at a rate related to the rotational velocity of the disc;

reading beam transmission means coupled to said driven player arm for applying a reading beam from a source to the disc surface and for transmitting to a reading transducer the beam reflected from the disc surface;

movable mirror means in the path of said reading beam transmission means for radially translating the point of impingement of the reading beam on the disc surface for accurately determining the exact point of impingement of the beam on the disc surface;

said movable mirror means including a piezoelectric beam adapted to flex in a direction orthogonal to said beam axis and having a reflecting surface orthogonally mounted on a free end of said beam whereby flexing of said beam moves said reflecting surface in an arc.

3,914,542
TIMING SIGNALS FOR VELOCITY ERROR CORRECTION

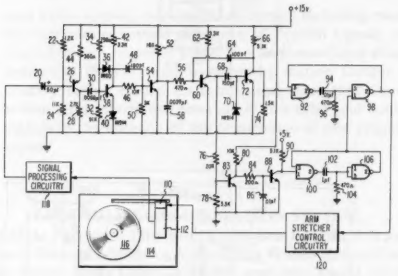
Charles D. Boltz, Jr., Greenwood, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 1, 1973, Ser. No. 402,081
Claims priority, application United Kingdom, Mar. 20, 1973, 13263/73
Int. Cl. G11b 17/00
U.S. Cl. 178—6.6 A 6 Claims

1. In a playback system for an information storing disc of the type providing storage of prerecorded composite signals comprising regularly recurring synchronization components,

including horizontal synchronization pulses and serrated vertical synchronization pulses, and associated picture-representative video signal; said playback system including pickup means for recovering the stored composite signals under playback conditions involving the provision of relative motion between said pickup means and said disc; said playback system being undesirably subject to spurious variations of the velocity of relative motion between said pickup means and said disc during playback; velocity error correction apparatus comprising:

means for adjusting the position of said pickup means to alter the velocity of relative motion between said pickup means and said disc during playback of an information storing disc;



means for controlling the energization of said pickup means position adjusting means;

means for supplying timing information, derived from recurring synchronization components of the composite signals recovered by said pickup means, to said controlling means to effect operation of said position adjusting means in a sense opposing said spurious variations of said relative velocity; and

means, selectively responsive to the vertical synchronization pulses of the composite signals recovered by said pickup means, for disabling said timing information supplying means during the occurrence of each of said vertical synchronization pulses.

3,914,543

IMAGE ANALYZER USING A STANDARD SCANNING OR A MULTI-INTERLACED SCANNING TYPE TELEVISION SYSTEM

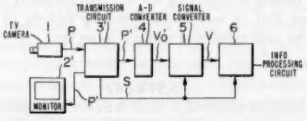
Atsushi Kawahara, and Koji Yamada, both of Kawasaki, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 5, 1973, Ser. No. 403,901

Claims priority, application Japan, Oct. 9, 1972, 47-100628

Int. Cl.[2] H04N *7/18*

U.S. Cl. 178—6.8 **6 Claims**



1. An image analyzer using an interlaced scanning type television system comprising:

a television circuit for converting an image to be analyzed into analog video signals;

a converter circuit for converting said analog video signals into digital video signals;

shift registers for storing and reading out said digital signals for respective fields, said shift registers corresponding in number to the number of said fields;

a pulse supply circuit for supplying a first clock pulse for imparting a storage operation to said shift registers so that the digital signals for respective fields are successively stored in said shift registers corresponding to said respective fields, and for supplying a second clock pulse for imparting a read-out operation to said shift registers, after completion of said storage operation, so that said digital signals are successively read out of said shift registers in order of the horizontal scanning lines as they form one frame;

a gate circuit for combining all the read-out outputs of said shift registers into one frame; and

means for processing the output from said gate circuit.

3,914,544

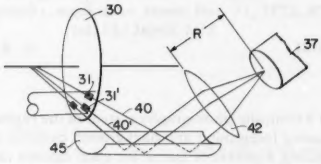
APPARATUS FOR HALOGRAPHICALLY RECORDING AND REPRODUCING PICTURE IMAGES ON A DISC

Hideo Watanabe, Hino; Yoshivuki Seki, Tokyo, and Jikko Takeuchi, Koganei, all of Japan, assignors to Fuji Telecasting Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 251,911, May 10, 1972. This application Mar. 8, 1974, Ser. No. 449,347

Int. Cl.[2] H04N *3/00*

U.S. Cl. 178—6.8 **5 Claims**



2. In a system of disc reproducing picture images utilizing holograms wherein frame images are arranged as respective holograms along a disc-shaped path on a disc shaped recording body;

means for reproducing picture images utilizing holograms comprising optical means to condense the diffraction rays produced by a read-out laser ray passing a respective frame of the holograms; and

means for compensating for migration of an image reproduced at a photoelectric conversion portion of a television camera caused by the rotation of said disc-shaped hologram recording body.

3,914,545

AUTOMATIC CONTRAST CONTROL UTILIZING THREE CONTROL SIGNALS

Christopher M. Engel, Franklin Park, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Continuation of Ser. No. 277,427, Aug. 2, 1972, abandoned. This application Sept. 9, 1974, Ser. No. 504,632

Int. Cl.[2] H04N *5/58*

U.S. Cl. 178—7.5 R **11 Claims**

1. In a television receiver having a luminance processing channel for translating instantaneous luminance signals derived from received broadcast transmissions to an image reproducer, said luminance signals including black level reference information, an automatic contrast control circuit comprising in combination:

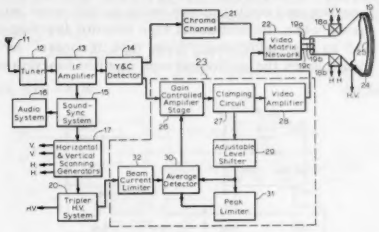
a gain-controlled luminance amplifier stage having an input, and an output coupled to said image reproducer;

clamping means coupled to the output of said stage for stabilizing the black level of said luminance signals at a reference level;

automatic brightness means including average detector means having an input coupled to said amplifier stage and to said clamping means for receiving said luminance

signals and developing therefrom control signals representative of the average DC level of said luminance signals, and an output for feeding back said control signals to said amplifier stage to vary its gain inversely with changes in the average DC level;

beam current limiter means coupled to said average detector means for monitoring and limiting the beam current developed in said image reproducer; and



peak detector means having an input coupled to said clamping means for receiving said luminance signals and an output coupled to said average detector means for modifying said control signals whenever the brightness components of said luminance signals exceed a threshold level to effect overriding inverse gain variations for said amplifier stage irrespective of the average DC level of said luminance signals.

3,914,546

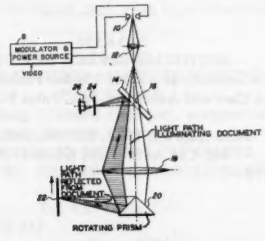
COMMON PATH IMAGE EXPLORING APPARATUS

Ralph A. Hamaker, Penfield, and Charles T. Roth, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 702,897, Feb. 5, 1968, abandoned. This application Apr. 8, 1974, Ser. No. 458,606

Int. Cl. H04n *1/04, 3/08*

U.S. Cl. 178—7.6 **6 Claims**



1. In a facsimile communication system, a common path image exploring apparatus comprising:

an illuminating light source, first means in the path of light from said light source for passing a part of said light,

lens means in the path of light passed by said first means for focusing said light,

reflecting means in the optical path of said lens means for reflecting said light to an operating area, said reflecting means comprising a rotating prism for effecting a transverse scan at said operating area,

document means at said operating area for reflecting said reflected light back to said reflecting means in accordance with the information on said document in a first mode,

said reflecting means receiving the information modulated light from said document and further reflecting said light back along the original light path toward said lens means,

said lens means focusing said modulated light onto said first means wherein said first means focuses said modulated light to an operating point,

photodetector means at said operating point for generating electrical video signals in accordance with the information modulated light in said first mode,

means for modulating said illuminating light source in accordance with an external source of electrical video signals in a second mode,

said first means comprising an aperture mirror wherein said aperture is placed in the path of light from said light source to said lens means and so positioned that the light from said light source is transmitted through said mirror aperture while said information modulated light in said first mode reflected back from said reflecting means is reflected by said aperture mirror toward said photodetection means,

photoreceptor means at said operating area in said second mode for receiving said modulated light from said light source along the same path of light as in said first mode, and

aperture plate means positioned between said first means and said photodetector means to define one scan line of said information modulated light.

3,914,547

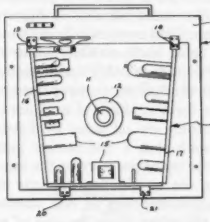
TELEVISION CHASSIS STRUCTURE

Russell J. Callender, 931 University Ave., St. Paul, Minn. 55104

Continuation of Ser. No. 296,637, July 22, 1963, abandoned, which is a continuation-in-part of Ser. No. 839,212, Jan. 21, 1953, abandoned, and Ser. No. 332,233, Jan. 21, 1953, abandoned. This application Aug. 26, 1970, Ser. No. 67,283

Int. Cl. H04n *5/64*

U.S. Cl. 178—7.9 **1 Claim**

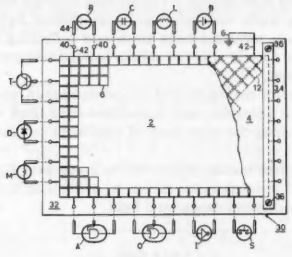


1. A television receiver having a relatively permanent television cabinet structure portion having an open front for mounting a conventional picture tube screen end therein, said picture tube having a stem end adapted to extend rearwardly from said cabinet portion, said cabinet structure having cabinet walls adapted to extend partially about said picture tube stem and enclosing the picture tube screen end thereof, an open back wall on said cabinet structure through which said tube stem is adapted to extend, a perforated chassis structure adapted to extend about said stem and having upwardly extending perforated walls secured to and extending rearwardly of said cabinet structure, component receiver elements and circuitry therefore mounted in closely spaced relationship among the perforations of said perforated chassis, a closure cover mounted over said chassis having perforated top and bottom portions, wherein the said perforated chassis is an open top structure having perforated base and perforated side members mounting said component receiver elements about said stem of said television picture tube externally of said cabinet portion, whereby an increased air flow volume passes through said perforations in said cover and said perforations in said chassis and dissipates the heat from said component elements retaining the maximum efficiency of receiver component elements.

3,914,548
STYLUS ACTUATED ELECTRICAL DEVICE AND ELECTRICAL KIT INCLUDING SAME

Benjamin J. Barish, 36 Yehuda Hanassi, 36 Yehuda Hanassi St., Israel

Continuation-in-part of Ser. No. 265,985, June 26, 1972, abandoned. This application Mar. 1, 1974, Ser. No. 447,333
Claims priority, application Israel, June 30, 1971, 37197
Int. Cl. G11c *5/02;* **G09b** *23/18*
U.S. Cl. 178—18 **10 Claims**



1. An electrical device comprising a supporting member carrying at least one electrically conductive element, and a flexible sheet member carrying at least one electrically conductive element placeable on top of the supporting member with the two conductive elements facing each other, at least one of said members including a coating of insulating material to insulate the conductive elements from each other when the flexible sheet member is placed on top of the supporting member, said insulating coating being of a soft, pressure-flowable material which parts under the pressure of a stylus applied to the flexible sheet member to thereby bring the two conductive elements into contact with each other, said insulating coating also being tacky to hold the two conductive elements in contact with each other upon removing the pressure of the stylus, said conductive elements on both of said members being in the form of discrete conductive deposits insulated from the others on all sides by narrow interruptions between them, such that a conductive pathway is formed along the line of the stylus pressure by the successive electrical contacts between the conductive deposits of the two members, the conductive deposits of one member bridging the interruptions of the other along the line of movement of the stylus, said conductive pathway being erasable by the separation of the two members.

3,914,549
ELECTRICAL AUDIO SIGNAL PROCESSING

Amar G. Bose, Chestnut Hill, Mass., assignor to Bose Corporation, Framingham, Mass.

Continuation of Ser. No. 782,693, Dec. 10, 1968, abandoned, which is a continuation-in-part of Ser. No. 690,695, Dec. 4, 1967, Pat. No. 3,582,553. This application Mar. 13, 1972, Ser. No. 234,042
Int. Cl.² H04R *5/04*
U.S. Cl. 179—1 G **5 Claims**

1. Apparatus for association with but separately packaged from audio signal amplifying means having a tape monitor switch for selecting a tape monitor function,

a "to tape recorder" terminal means and a "from tape recorder" terminal means, said apparatus comprising,

active audio electrical signal processing circuit means having an input and an output for providing equalization of an input signal over at least a portion of the audio frequency range,

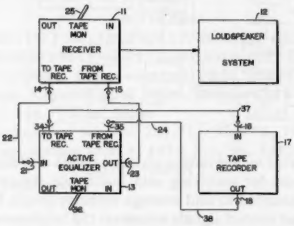
input terminal means for coupling to the "to tape recorder" terminal means,

output terminal means for coupling to the "from tape recorder" terminal means and coupled to said circuit means output,

additional "to tape recorder" terminal means for coupling to the input of a tape recorder and coupled to said input terminal means,

additional "from tape recorder" terminal means for coupling to the output of a tape recorder,

and additional tape monitor switching means for selectively coupling said circuit means input to said input terminal means when the additional tape monitor function is out and to said additional "from tape recorder" terminal means when the additional tape monitor function is in,

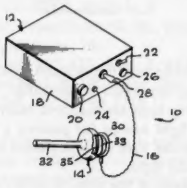


whereby when the additional tape monitor function is out said additional tape monitor switching means comprises means coupling both said input terminal means and said additional "to tape recorder" terminal means to said audio electrical signal processing circuit means input while then keeping said additional "from tape recorder" terminal means disconnected therefrom and when the additional tape monitor function is in said additional tape monitor switching means comprises means coupling said additional "from tape recorder" terminal means to said audio electrical signal processing circuit means input while keeping both said additional "to tape recorder" terminal means and said input terminal means disconnected therefrom.

3,914,550
ARTIFICIAL SPEECH DEVICE

Gilbert I. Cardwell, Jr., Palos Verdes Peninsula, Calif., assignor to Cardwell Associates, Inc., Palos Verdes Peninsula, Calif.

Filed Aug. 13, 1973, Ser. No. 388,029
Int. Cl.² A61F *1/20;* **G10L** *1/10*
U.S. Cl. 179—1 AL **2 Claims**



1. An artificial speech device comprising:

oscillator means for generating a succession of generally equally spaced timing signals;

monostable means responsive to the timing signals for assuming an unstable state for a selected period of time in response to each of the timing signals and for thereafter assuming a stable state;

an electro-acoustic transducer;

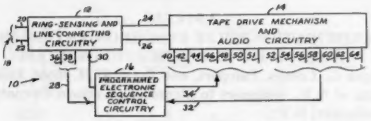
means coupled to energize the transducer whenever the monostable means is in the unstable state; and

a flyback damping circuit coupled between the monostable means and the transducer and comprising the serial combination of diode means and resistor means.

3,914,551
TELEPHONE ANSWERING DEVICE WITH PROGRAMMED ELECTRONIC SEQUENCE CONTROL

Theodore R. Hunt, Aloha, Oreg., assignor to Data Time, Inc., Portland, Oreg.

Filed Apr. 3, 1974, Ser. No. 457,585
Int. Cl.² H04N *1/64*
U.S. Cl. 179—6 R **4 Claims**


RING-SENSING AND LINE-CONNECTING CIRCUITRY
TAPE DRIVE MECHANISM AND AUDIO CIRCUITRY
PROGRAMMED ELECTRONIC SEQUENCE CONTROL CIRCUITRY

1. In a telephone answering device including recording means, playback means, and line-coupling and interface means, constructed for operation of said several means in a plurality of different, individually selectable operating modes, each characterized by one or more operating stages,

mode selector means for selecting an operating mode for said device and for producing a first electrical output signal condition indicative exclusively of the selected mode,

electronic staging means operatively connected to said recording means, playback means, and line-coupling and interface means for sensing the respective operational statuses thereof, and for producing a second electrical output signal condition indicative of such statuses, and

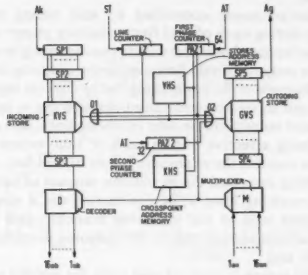
programmed electronic performance-directing means, including memory means, operatively connected to said recording, playback, and line-coupling and interface means, and responsive to said first and second output signal conditions for effecting operation of said several means as required at each stage in an operating mode.

3,914,552
PCM TIME-DIVISION MULTIPLEX SWITCHING PROCEDURE

Karlheinz Neufang, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Mar. 26, 1974, Ser. No. 454,852
Claims priority, application Germany, Mar. 30, 1973, 2316042
Int. Cl.² H04J *3/16*
U.S. Cl. 179—15 AQ **1 Claim**

1. A procedure for operating a PCM time-division communication network having a number of PCM time-division multiplex switching centers connected to one another via four-wire time-division multiplex connections, said PCM time-division mutiplex switching centers having storage devices individually assigned to each pair of conductors of one of the four-wire time-division multiplex connections to store all the elements of information coming in or to be retransmitted on one of the time-division multiplex connections during a pulse frame, the pulse frame being determined by the duration of the time-division multiplex system sampling period, said centers further having crosspoint elements for the space-division switching of the elements of information, link connections connecting said crosspoint elements to the crosspoints allocated to the other time-division multiplex connections and address memories which produce the space and time-division coordination of the operation of said crosspoint elements and of the storage locations assigned to the individual communication time slots, further having means for electronic signal processing and data matching, each having access to the particular storage device of a switching center via a separate line connection, characterized in that the signals transmitted in a specified communication channel (e.g., **16**) and the synchronization information for the time-division multiplex connection transmitted in another specified communication channel (e.g., **0**) during fixed switching phases (e.g., **0** or **23**) are

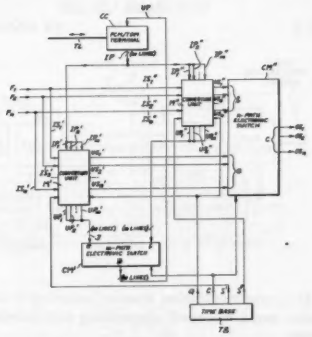


switched to and from the particular device for electronic signal processing or data matching, for which the particular storage (KVS, GVS) and crosspoint controls (D,M) are directly accessed during the fixed swtiching phases by the phase counter (PAZ1) which determines the switching phases and therefore normally cause the output of selection addresses from the storages and crosspoints by the address memories (VHS, KHS) bypassing the address memories.

3,914,553
MULTIPLEXING/DEMULTIPLEXING NETWORK WITH SERIES/PARALLEL CONVERSION FOR TDM SYSTEM

Flavio Melindo, and Giovanni Perucca, both of Turin, Italy, assignors to CSELT-Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed Sept. 23, 1974, Ser. No. 508,612
Claims priority, application Italy, Sept. 24, 1973, 69793/73
Int. Cl.² H04J *3/00*
U.S. Cl. 179—15 AT **6 Claims**



1. In a pulse-code-modulation system with n channels having incoming and outgoing branches each adapted to carry a succession of words of m bits each traveling serially thereover, and with a time-division-multiplex terminal having m receiving lines for the bits of a word from any of said incoming branches and m transmitting lines for the bits of a word destined for any of said outgoing branches, the combination therewith of a multiplexing/demultiplexing network comprising:

a first and a second conversion unit each including an orthogonal matrix of $m \cdot n$ register stages for the storage of individual bits, said matrix being divided into m columns and n rows with respective inputs and outputs;

timing means establishing a continuous sequence of alternating first and second switching phases, the duration of each of said switching phases equaling the time period occupied by an m-bit word traveling on any of said channels;

switchover means controlled by said timing means and effective during each of said first switching phases to connect the n row inputs of said first unit to the incoming branches and the n row outputs of said first unit to the outgoing branches of said n channels while connecting the m column inputs of said second unit to said transmitting lines and the m column outputs of said second unit to said receiving lines, said switchover means being effective during each of said second switching phases to connect the m column inputs of said first unit to said transmitting lines and the m column outputs of said first unit to said receiving lines while connecting the n row inputs of said second unit to the incoming branches and the n row outputs of said second unit to the outgoing branches of said n channels; and

transfer means in each of said units for serially reading out the m bits stored in each row thereof to said outgoing branches concurrently with a progressive loading of the stages of said rows with the bits of a group of newly arriving words from said incoming branches during one of said switching phases and for serially reading out the n bits of respective words stored in the columns thereof to said receiving lines concurrently with a progressive loading of the stages of said columns with corresponding bits of a sequence of n words from said transmitting lines during the other of said switching phases.

3,914,554

COMMUNICATION SYSTEM EMPLOYING SPECTRUM FOLDING

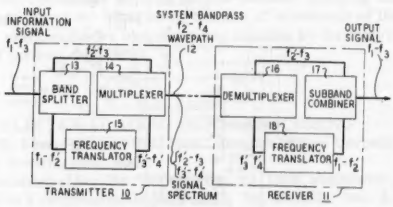
Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 18, 1973, Ser. No. 361,569

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H04B *1/66*

U.S. Cl. 179—15.55 R **7 Claims**



1. In a communication system including a transmitter, a receiver, and a wavepath connecting said transmitter to said receiver:

means for transmitting and receiving an input signal having a frequency spectrum f_1–f_3 which only partially overlaps the passband f_2–f_4 of said system, and which is less than said passband;

said means comprising at said transmitter:

a bandsplitter for dividing said signal into two subbands f_1–f'_2 and f'_3–f_3, where the first of said subbands includes that portion of the signal spectrum that falls outside said passband, and where the second of said subbands falls wholly within said passband;

a frequency translator for shifting the frequencies of said first subband to a region f'_3–f'_4 of said passband not occupied by said second subband;

and a multiplexer for combining said second subband f'_2–f_3 and said frequency-shifted first subband f'_3–f'_4 for transmission along said wavepath;

and where said means comprises at said receiver:

a demultiplexer for separating said second subband f'_2–f_3 and said frequency-shifted first subband f'_3–f'_4;

a second frequency translator for shifting the frequencies of said frequency-shifted subband f'_3–f'_4 back to f_1–f'_2; and means for recombining said first and said second subbands f_1–f'_2 and f'_2–f_3 to reform said input signal spectrum f_1–f_3.

3,914,555

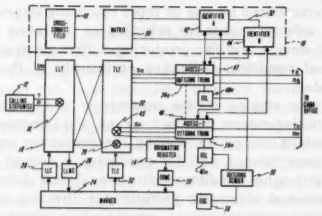
IDENTIFICATION PULSE SYNCHRONIZATION IN AN AUTOMATIC IDENTIFICATION SYSTEM

Enrique G. Comas, Fairport, and Bernard H. Root, Palmyra, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed June 26, 1974, Ser. No. 483,465

Int. Cl. H04m *1/56;* **H04q** *3/72*

U.S. Cl. 179—18 FH **6 Claims**



1. Improved automatic number identification apparatus in a telephone system of the type having:

A. a central office;

B. a plurality of subscriber lines connected to said central office, each of said subscriber lines having

C. a sleeve lead associated therewith in said central office;

D. an outgoing trunk circuit in said central office;

E. means in said central office for connecting the sleeve lead associated with one of said plurality of subscriber lines initiating a call to said outgoing trunk circuit;

F. means in said central office for applying a metering signal to said sleeve lead, said signal having a low amplitude portion and a high amplitude portion;

G. a plurality of number elements, at least one of said plurality of number elements each associated with a different one of said plurality of subscriber lines and connected to said sleeve lead associated therewith;

H. a plurality of directory number digit buses, said plurality of number elements each so connected through isolation means to said digit buses that a high amplitude signal issuing from any one of said number elements appears simultaneously on preselected ones of said digit buses to form indicia thereon representatve of a unique directory number associated with said any one number element;

I. an identifier unit having said plurality of directory number digit buses connected thereto;

J. means for connecting the sleeve lead associated with said one subscriber line initiating a call from said outgoing trunk circuit to said identifier unit;

wherein the improvement comprises:

1. means in said identifier for generating a high amplitude identification signal for application to said sleeve lead;

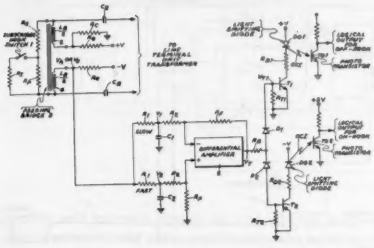
2. means in said identifier for receiving said metering signal; and

3. means in said identifier responsive to said receiving means for synchronizing said generating means to produce said identification signal during said low amplitude portion of said metering signal.

3,914,556
ON-HOOK AND OFF-HOOK DETECTOR FOR TELEPHONE SWITCHING SYSTEMS

Foster Wayne Frazee, Pompton Lakes, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed June 12, 1974, Ser. No. 478,676
Int. Cl. H04m 3/22
U.S. Cl. 179—18 F **9 Claims**



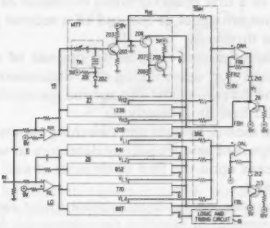
1. A differential on-hook detector for telephone switching systems using common battery signalling comprising:
a subscriber hook switch;
a battery having first and second terminals;
a subscriber line coupled to said battery and said hook switch, said line having a first resistance when said hook switch is in an on-hook state and a second resistance when said hook switch is in an off-hook state;
a first time constant circuit coupled to said line, said first time constant circuit having a first time constant;
a second time constant circuit coupled to said line, said second time constant circuit having a second time constant less than said first time constant;
a differential amplifier having an output, a negative input coupled to said first time constant circuit and a positive input coupled to said second time constant circuit;
said first and second time constant circuits and said differential amplifier cooperating to produce a positive output voltage when the resistance of said line changes from said first resistance to said second resistance and to produce a negative output voltage when the resistance of said line changes from said second resistance to said first resistance;
first means coupled to said output of said differential amplifier responsive to said positive output voltage to provide a first output signal when said hook switch changes from said on-hook state to said off-hook state; and
second means coupled to said output of said differential amplifier responsive to said negative output voltage to provide a second output signal when said hook switch changes from said off-hook state to said on-hook state.

3,914,557
MULTIFREQUENCY TONE DETECTING ARRANGEMENT

John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 11, 1973, Ser. No. 349,948
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H04M 1/50; H04Q 9/12
U.S. Cl. 179—84 VF **12 Claims**

8. An arrangement for detecting one of a plurality of permissible discrete tone signals, and for discriminating against the detection of any other tone in a predetermined band of frequencies comprising
a respective circuit for resonating in response to the occurrence of each said discrete signal frequency,
a circuit for sampling the output of each said resonating circuits to develop a control signal which is the sum of the amplitudes of the signal presented by each said resonating circuit,

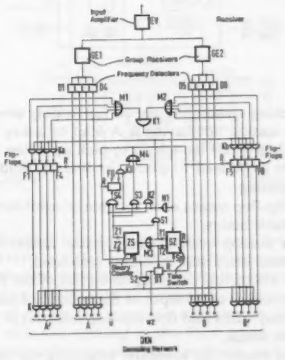


utilization circuit means,
a respective threshold sensitive device connected between each said resonating circuit and said utilization device, and
means for delivering said control signal from said sampling circuit to each said threshold sensitive device for establishing the minimum signal which must be present at any said resonating circuit output to be coupled to said utilization circuit means.

3,914,558
CIRCUIT ARRANGEMENT FOR MULTIPLE FREQUENCY CODE CHARACTER RECEIVERS IN TELECOMMUNICATION SYSTEMS

Klaus Dieter Rother, Planegg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 23, 1973, Ser. No. 381,614
Claims priority, application Germany, July 26, 1972, 2236781
Int. Cl.² H04M 1/00
U.S. Cl. 179—84 VF **2 Claims**



1. Apparatus for multiple frequency code character receivers having a plurality of frequency detectors and used in telecommunication systems characters of a first type are received

from a pair of audio frequencies and characters of a second type are received from two pairs of rapidly succeeding audio frequencies, comprising:

first switching means for monitoring the beginning of each pair of audio frequencies, said first switching means being coupled, respectively, to outputs of said frequency detectors,

time switch means, operable responsive to said first switching means, for determining the duration of each pair of audio frequencies and for producing a first output signal at the end of a first predetermined threshold of time and a second output signal at the end of a second predetermined time threshold,

second switching means coupled to outputs of said time switch means for determining the attainment of said second time threshold and the second successive attainment of said first time threshold,

buffer storage means, said second switching means connecting the outputs of said frequency detectors to said buffer storage means upon the first attainment of said first time threshold and

interpreting means, operable responsive to the second successive attainment of said first time threshold, for receiving the contents of said buffer storage means and the instantaneous output of said frequency detectors as characters of said second type, and, operable responsive to attainment of said second time threshold, for receiving the instantaneous outputs of said frequency detectors as characters of said first type.

3,914,559

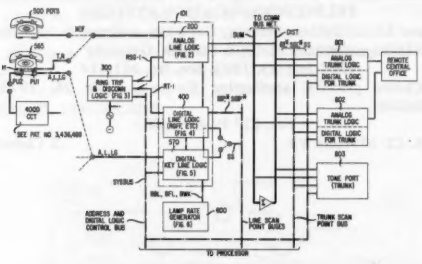
UNIVERSAL PBX LINE CIRCUIT FOR KEY AND NON-KEY SERVICE

Dieter John Henry Knollman, Arvada, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 7, 1974, Ser. No. 521,649

Int. Cl. H04m *1/00*

U.S. Cl. 179—99 **11 Claims**



1. A switching system line circuit for flexibly serving either a telephone station not having a A lead or a key telephone station which grounds its A lead to pick up a line and which open-circuits its A lead to place the line on hold, said line circuit comprising

a pair of flip-flop means each capable of exhibiting a plurality of stable states,

means for placing both of said flip-flop means in the first stable state when said A lead is grounded,

means for effectively coupling an output of the first of said flip-flop means to an input of the second of said flip-flop means only when said first flip-flop means is in the first of its stable states,

scan point means for normally reporting the switchhook state of the telephone set to said switching system,

means operable to override said reporting by said scan point means and for substituting a predetermined report, and

means for effectively coupling an output of said second flip-flop means to operate said operable means only when said second flip-flop means is in the second of its stable states.

3,914,560

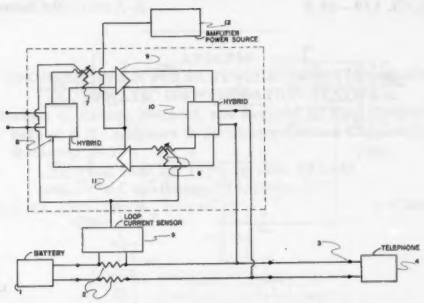
SELF-ADJUSTING REPEATER FOR VOICE FREQUENCY TELEPHONE TRANSMISSION SYSTEMS

Clifford E. Greene, Fort Worth, Tex., assignor to Superior Continental Corporation, Hickory, N.C.

Filed Oct. 13, 1971, Ser. No. 188,914

Int. Cl. H04b *3/36*

U.S. Cl. 179—170 R **8 Claims**



1. In a voice frequency telephone transmission system, a voice frequency repeater having a signal-transmitting circuit which includes an amplifier for amplifying voice frequency signals and controllable means for varying the gain which the circuit provides between its input and output terminals, a telephone, a loaded two-conductor transmission line providing a connection between said circuit and said telephone for transmitting the voice frequency signals, said repeater being connected to the central office end of said line, and means electrically connected to said line and said controllable means and controlling said controllable means to provide said circuit with an amount of gain that maintains the transmission loss of said signals approximately constant regardless of the length of said line or the gauge of the transmission line conductors whenever the loop resistance of said line is within a predetermined range of resistances.

3,914,561

APPARATUS AND METHOD FOR TRACING JUMPERS IN A MAIN DISTRIBUTING FRAME

Courtney Harold Schardt, Millington, and Albert James Schepis, Parsippany, both of N.J., assignors to American Telephone and Telegraph, Broadway, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of Ser. No. 205,801, Dec. 8, 1971, abandoned. This application Apr. 27, 1973, Ser. No. 355,269

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] H04B *3/46*

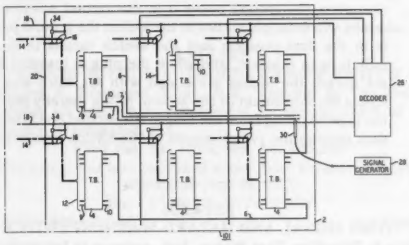
U.S. Cl. 179—175.3 A **16 Claims**

14. In a wiring frame having a plurality of terminal blocks, conductors adapted for interconnecting said terminal blocks, a plurality of cables which are mounted to respective ones of said terminal blocks and connected to said conductors therethrough, and magnetic cores about respective ones of said cables, the method of locating the ends of said conductors comprising the steps of:

interconnecting said cores with a matrix of address wires so that the location of each core is defined by a crosspoint of said matrix;

placing an identification signal on one of said conductors so that said signal is transmitted to any one of said terminal blocks to which said conductors is connected and thereby

to said cable associated therewith, said core about said cable being responsive to said identification signal to change the magnetic field thereof and produce location signals on said address wires interconnected therewith; and



detecting said location signals on said address wires so that the location of said cores and thereby the location of said terminal blocks having said identification signal thereon can be determined.

3,914,562

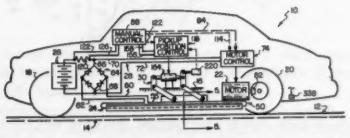
SUPPLYING POWER TO VEHICLES

John G. Bolger, 469 Tahos Road, Orinda, Calif. 94563

Substitute for Ser. No. 146,214, May 24, 1971, abandoned. This application Sept. 10, 1974, Ser. No. 504,843

Int. Cl.² B60J *9/00*

U.S. Cl. 191—10 **9 Claims**



1. A vehicle for use on a prepared road having associated therewith a power source creating a magnetic field, the vehicle comprising

a framework having a plurality of road engaging elements thereon;

an electric motor for driving at least one of the elements;

means on the vehicle for receiving power from the magnetic field in quantities proportional to the distance between the power source and the power receiving means to supply received power during travel along the road;

means for moving the power receiving means toward and away from the power source;

a source of current for supplying power to the electric motor when the vehicle is off of roads equipped with the power source;

means electrically connecting the received power supplying means, the current source and the electric motor; and

means operative when the vehicle is traveling along the road having the power source thereat for manipulating the moving means in response to the difference between energy delivered by the received power supply means and energy consumed by the vehicle.

3,914,563

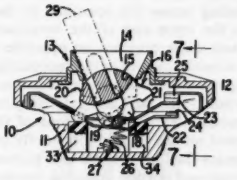
KEY OPERATED SWITCH

James C. Prior, Gardena, Calif., assignor to Sola Basic Industries, Inc., Milwaukee, Wis.

Filed June 28, 1974, Ser. No. 484,305

Int. Cl.² H01H *27/00*

U.S. Cl. 200—42 T **4 Claims**



1. In a key operated electric switch, the combination including switch mechanism movable to at least two switching positions, a housing for said switch mechanism and enclosing the same, an upstanding closure member arranged in said housing and having an elongated slot therein, and a rockable switch mechanism actuator means between said slot and said switch mechanism, the underside of said slot being arcuate and the top of said rockable switch mechanism having an arcuate shaped portion complemental to said arcuate slot, said switch mechanism operator having vertically extending key receiving apertures therein with closed bottoms, said switch mechanism operator completely straddling said slot in all positions and blocking access to the switch mechanism in said housing, and a key means insertable within said closure slot and having projections on one end thereof for insertion within said key receiving apertures to permit arcuate switch actuating movement of said switch mechanism actuator means by said key means and otherwise blocking access to the switch mechanism.

3,914,564

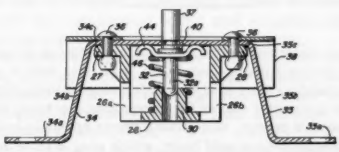
AUTOMATIC BY-PASS DEVICE FOR A WATT HOUR METER SOCKET

Ronald H. Reed, Versailles, and Raymond A. Diersing, Lexington, both of Ky., assignors to Square D Company, Park Ridge, Ill.

Filed Aug. 22, 1974, Ser. No. 499,753

Int. Cl.² H01R *33/30*

U.S. Cl. 200—51.1 **5 Claims**



1. An automatic by-pass switching means for use with a meter socket for a watt-hour meter having two pairs of contact blades extending outwardly therefrom, the meter socket including a front cover portion having an opening therein and two pairs of spring-jaw terminals mounted in the socket in alignment with the opening in the front cover portion, connected to respective line and load terminals, and respectively adapted to receive the contact blades of the meter, the by-pass switching means being operable to provide continuous electrical service when the meter is removed from the meter socket and the contact blades are removed from the spring-jaw terminals, the by-pass switching means comprising a pair of by-pass

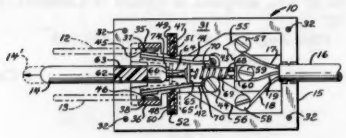
switch mechanisms, each switch mechanism comprising a pair of Z-shaped contact brackets extending toward each other between respective line and load terminals of the meter socket and each having a base portion and a contact portion, the base portion of one contact bracket being secured to a load terminal of the meter socket and the base portion of the other contact bracket being secured to a line terminal of the meter socket, an open-ended insulating receptacle supported at opposite sides thereof by the contact portions, the contact portions extending across the open end of the receptacle to partially close the open end of the receptacle, a push rod having inner and outer portions on opposite sides of an inwardly facing shoulder, a seat in the receptacle for reciprocatively receiving the inner end portion of the push rod with the upper end portion of the push rod extending outwardly of the receptacle beyond the contact portions of the contact and slidably mounted on the push rod inwardly of the shoulder, and biasing means having opposite end portions, the biasing means having one end portion engaging the seat of the receptacle and the other end portion engaging the contact bridge, thereby to bias the contact bridge into engagement with the stationary contact portions when the watt-hour meter is not positioned in the socket, the outer end portions of the push rods of both switch mechanisms being positioned to be engaged by the base of the watt-hour meter when the watt-hour meter is positioned in the socket thereby to compress the biasing means and depress the slidable contact bridges of both switch mechanisms out of engagement with their associated stationary contact portions, whereby upon removal of the watt-hour meter from the meter socket the biasing means biases the contact bridges outwardly to engage their associated stationary contacts to provide an alternative current path between the line and load terminals of the meter socket.

3,914,565

ELECTRICAL PLUG WITH GROUND PRONG ACTIVATED SWITCH

Karl O. Niedermeyer, 17W068 North St., Bensenville, Ill. 60106

Filed Aug. 26, 1974, Ser. No. 500,316
Int. Cl.[2] H01R *33/30*
U.S. Cl. 200—51.09 **12 Claims**



1. In an electrical plug including a body having an end, two current carrying prongs extending from said end, a ground prong extending from said end and having a longitudinal axis and wire connector means for connecting electrical wires to the respective prongs, said ground prong normally extending a given distance from said body, which plug is to be inserted into an electrical socket having first and second ways for receiving the current carrying prongs respectively, a third way for receiving the ground prong and means associated with the third way for restricting movement of the ground prong with respect to the third way, the improvement wherein said plug includes:

switch means in said body and connected between one of said current carrying prongs and the respective wire connector means, said switch means being movable between switch-open and switch-closed positions;

said body journaling said ground prong for longitudinal movement between a first position at which the ground prong extends more than said given distance from said body and a second position at which the ground prong extends approximately said given distance from said body;

means engaging said body and said ground prong for resiliently urging said ground prong toward said first position and away from said second position; and

switch operating means engaging said ground prong and said switch means for placing said switch means in switch-open position when said ground prong is in the first position and placing said switch means in switch-closed position when the ground prong is in the second position;

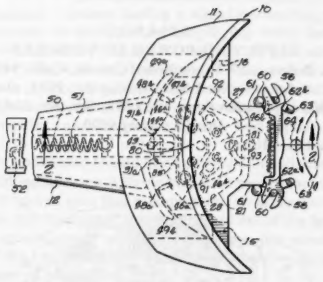
whereby when the plug is not in the socket the ground prong is in the first position and the switch means is in the switch-open position, and when the plug is inserted into the socket the means associated with the third way restricts the movement of the ground prong thereby moving the ground prong from the first to the second position and thus placing the switch means in the switch-closed position.

3,914,566

TURN SIGNAL AND HAZARD WARNING SWITCH

John E. Wendling, Fort Wayne, Ind., assignor to International Harvester Company, Chicago, Ill.

Filed Jan. 12, 1973, Ser. No. 323,191
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] H01H *3/16*
U.S. Cl. 200—61.27 **12 Claims**



1. In a turn signal and hazard warning electrical switch device for use in a vehicle having a stationary steering column and a steering wheel rotatably mounted on the steering column, the combination comprising:

a switch casing secured to said steering column;

means defining a cavity extending through said casing for receiving one end of a switch actuating lever therein;

a switch actuating lever extending into said cavity means and having an end portion disposed within said casing;

means pivotally mounting said actuating lever in said cavity means, said actuating lever being pivotal between first and second positions corresponding to left and right turn signal indicating positions, respectively;

spring means interconnecting said actuating lever and said casing for yieldably urging said actuating lever to a neutral position intermediate said first and second positions;

elongated cross bar means rigidly connected to said end portion of said actuating lever disposed within said casing, said cross bar means extending parallel to the plane of pivotal movement of said lever;

a pair of pawl members, each of said pawl members being pivotally mounted in a respective end of said cross bar means;

interengageable means on said casing and said pawl members to selectively hold said actuating lever in either one of said left and right turn signal indicating positions;

turn signal cancelling means carried by and movable in unison with the vehicle steering wheel;

means on said pawl members engageable by said turn signal cancelling means upon rotation of the vehicle steering wheel and when said actuating lever is in a left or right turn signal indicating position to release the actuating lever from such turn signal position and allow automatic return of the lever to said neutral position by said spring means.

3,914,567

LIQUID MOTION ANTI-DISTURBANCE SWITCH

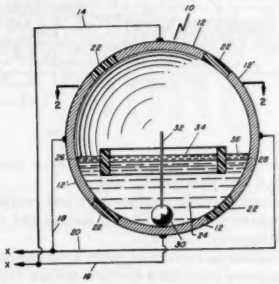
Richard E. Reinnagel, Elma, N.Y., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 15, 1974, Ser. No. 433,587

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H01H *35/14, 29/00*

U.S. Cl. 200—61.47 **6 Claims**



1. A liquid motion anti-disturbance switch which comprises:

a hollow housing having a first and a second set of terminals electrically insulated from each other;

a nonconducting fluid partially filling said housing;

floating pole means deposed upon said nonconducting fluid and electrically connected to said sets of terminals, said pole means maintaining said set of terminals in an open disconnected position when said switch is at a rest position, and closing said switch when said switch is subjected to motion which includes;

a conducting film ring floating on said nonconducting fluid for making electrical contact with at least one of the said first set of terminals;

a conducting film disc floating on said nonconducting fluid being electrically insulated from said film ring when said switch is at a rest position;

contact means slidably disposed within said housing for contacting at least one of said second set of terminals and electrically connecting said film disc to said second set of terminals; and

an insulating toroid disposed within said housing having a density lower than said nonconducting fluid whereby said toroid floats on said nonconducting fluid, and mechanically and electrically separates said conducting film ring from said conducting film disc when said switch is in said rest position, said toroid effecting closure of said switch when said switch is tilted or given sufficient motion to cause said toroid means to dip in said nonconducting fluid, thereby allowing said conducting film ring and film disc to flow together causing switch closure.

3,914,568

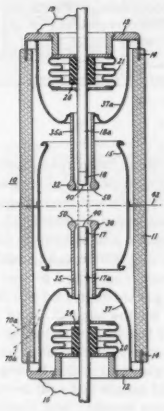
HIGH-VOLTAGE VACUUM SWITCH

Donald W. Crouch, Newtown Square; Donald R. Kurtz, West Chester, and Joseph C. Sofianek, Broomall, all of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Aug. 22, 1974, Ser. No. 499,740

Int. Cl.² H01H *33/66*

U.S. Cl. 200—144 B **9 Claims**



1. A high-voltage vacuum switch comprising:

a. a highly-evacuated envelope comprising spaced-apart conductive ends and electrical insulating means located between said ends for insulating the ends from each other when the interrupter is open and the ends are at different potentials;

b. a pair of contact rods respectively extending through said ends and each being movable with respect to its associated end in a direction longitudinal of said rod,

c. sealing means providing a seal between each of said rods and its associated end and permitting longitudinal movement of said rod with respect to said associated end,

d. a pair of contacts respectively fixed to the ends of said rods that are located within said envelope and having contact-making surfaces facing each other,

e. said rods being longitudinally movable toward each other to drive said contacts into a closed position where said contact-making surfaces engage each other and being longitudinally movable away from each other to effect opening of said switch,

f. a generally annular shielding electrode surrounding each of said rods and electrically connected to the rod surrounded thereby,

g. and means for mounting said shielding electrodes in fixed positions within said envelope where said shielding electrodes are located longitudinally-spaced from each other on opposite sides of the region where said contact-making surfaces engage when the switch is closed,

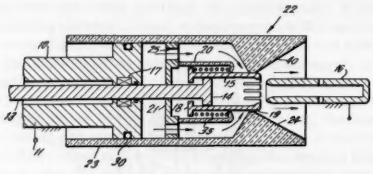
h. each of said shielding electrodes having a front surface facing the other shielding electrode,

i. each of said rods being movable during a switchopening operation into a withdrawn open position wherein the contact-making surface of its associated contact is located behind said front surface of its associated shielding electrode.

3,914,569
PUFFER INTERRUPTER WITH DOWNSTREAM INITIATED ARC

Lorne D. McConnell, Chalfont, and Hansruedi Aumayer, Harleysville, both of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Filed May 2, 1974, Ser. No. 466,408
Int. Cl.[2] H01H *33/70*
U.S. Cl. 200—148 A **6 Claims**



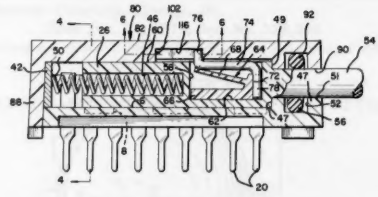
1. In a puffer type circuit interrupter; said puffer type circuit interrupter including a stationary elongated contact; a movable contact movable between an engaged and disengaged position with said stationary contact; an insulation nozzle surrounding said movable and stationary contacts, an operating rod connected to said nozzle and to said movable contact, a piston-cylinder means connected to said operating rod for producing a flow of gas through said nozzle and through the arc space produced by the separation of said movable and stationary contacts; a housing surrounding said contacts, said nozzle, and said piston-cylinder means and filled with a relatively high dielectric gas; said nozzle having an internal nozzle throat restriction; said nozzle and said movable contact being movable relative to one another; and biasing means normally biasing said nozzle and said movable contact to a position wherein the end of said movable contact is downstream of said nozzle throat restriction; and means for moving said end of said movable contact downstream of said nozzle throat restriction at a time following the initial movement of said movable contact to its disengaged position, whereby the initial arcing space between said movable and stationary contacts occurs upstream of said nozzle throat restriction, and whereby said arcing space is thereafter disposed downstream of said nozzle throat restriction and is swept free of arcing products by gas flow from said piston-cylinder means and through said nozzle throat restriction; said movable contact, said stationary contact and said nozzle each being coaxially disposed and each being generally axially elongated; said movable contact being fixed to said operating rod; said nozzle being flexibly mounted on said operating rod and being axially movable with respect thereto.

3,914,570
ALTERNATE MAKE AND BREAK TYPE OPERATING MEANS FOR PUSHBUTTON SWITCH ASSEMBLIES

Joseph Larue Lockard, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed July 5, 1973, Ser. No. 376,504
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] H01H *13/56*
U.S. Cl. 200—153 J **4 Claims**

1. A bi-stable switch, comprising:
a housing defined by a plurality of enclosing walls,
a pair of said walls having spaced grooves therein,
a plurality of electrical terminals in said grooves and maintained thereby in spaced relationship in said housing,
a carriage displaceable back and forth in said housing,
a pair of strip form terminals mounted on said carriage for electrically engaging selected terminals upon displacement of said carriage,
an extension portion on said carriage protruding from said housing,
said housing having a passageway in one of said enclosing walls arranged in a closed loop path,
said carriage having a projection having one end received rotatably in said carriage and another end received in said passageway and forced to traverse along said passageway as said carriage is displaceable back and forth in said housing,
said passageway having two spaced detent portions,
said projection second end initially in seating engagement in a first detent portion,
a spring in resilient compression between said carriage and said housing and being resiliently compressible and expansible in response to traverse of said carriage back and forth in said housing,
said carriage being displaceable in a first direction to traverse said projection second end along said passageway out of seating engagement in said first detent portion,
said carriage subsequently being displaceable in a second direction to traverse said projection second end along



said passageway into engagement in a second detent portion of said passageway, and
means on said carriage continuously and resiliently urging said projections to project said second end thereof into said passageway.

2. The structure as recited in claim **1**, wherein,
said passageway includes a bottom surface formed with a series of inclined ramps, with a shoulder defined between each adjacent pair of ramps,
said projection second end being forced to traverse along said passageway in one direction as said carriage is displaced back and forth in said housing,
said projection second end upon traverse along said passageway in a direction opposite to said one direction being stopped against one of said shoulders, which shoulder provides a barrier blocking the traverse of said projection second end in said direction opposite to said one direction, and
said means comprises a resilient hinge on said carriage continuously and resiliently engaging and biasing said projection to project the second end thereof into receipt within said passageway.

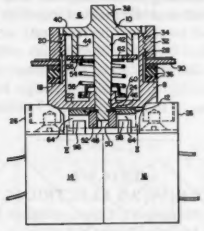
3,914,571
SWITCH OPERATOR WITH SPLIT CAM

Walter J. Kellogg, and Glenn R. Taylor, both of Beaver, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1974, Ser. No. 468,337
Int. Cl. H01h *3/42*; F16h *53/00*
U.S. Cl. 200—330 **5 Claims**

1. A switch operator for operating a plurality of reciprocable switch operating elements, comprising a rotatable selector member, a housing mounting said member, a cam comprising at least two separable camming surface structures, means detachably mounting said camming surface structures on said member to effect rotation of the cam upon movement of the member, the camming surfaces facing directions parallel to the axis of rotation of the selector member, at least two switch units on the housing and each unit comprising a contact oper-

ator including a reciprocable switch operating element adjacent to a corresponding camming surface structure, and said



camming structures comprise parting surfaces which are retained together when mounted on the mounting means.

3,914,572

APPARATUS FOR INDUCTIVELY HEATING THE BEARING SURFACES OF A CRANKSHAFT

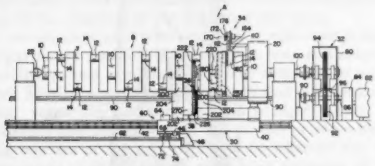
Fred C. Jensen, Euclid, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio

Filed Nov. 29, 1973, Ser. No. 420,016

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H05B *5/08*

U.S. Cl. 219—10.57 **11 Claims**



1. An apparatus for inductively heating the cylindrical surface of a bearing pin on a crankshaft as said crankshaft is rotated about its central axis, said surface having an axis generally parallel to said central axis and offset radially therefrom a given distance along a given radial line with respect to said crankshaft, said apparatus comprising: an inductor support element; an inductor generally matching said surface and carried by said element; means for rotating said crankshaft about said central axis whereby said pin axis orbits in a generally circular path concentric with said central axis and on a radius extending from said central axis said given distance; first and second members each rotated about its own pivot axis, said pivot axis being generally parallel to and coplanar with said central axis; a pivot pin carried by each of said first and second members and pivotally connected to said inductor support member, said pivot pins defining support means for said inductor support member and being generally spaced from one of said pivot axes in a direction generally parallel to said radial line and generally at said given distance; and, means driven by said rotating means for rotating said first and second members in timed relationship with said crankshaft.

10. An apparatus for inductively heating the cylindrical surface of a bearing pin on a crankshaft as said crankshaft is rotated about its central axis, said surface having an axis generally parallel to said central axis and offset radially therefrom a given distance along a given radial line with respect to said crankshaft, said apparatus comprising: an inductor support element; an inductor generally matching said surface and carried by said element; means for rotating said crankshaft about said central axis whereby said pin axis orbits in a generally circular path concentric with said central axis and on a radius extending from said central axis said given distance; and means for positively driving said inductor support element by said rotating means in a path corresponding to said generally circular path of said pin axis.

3,914,573

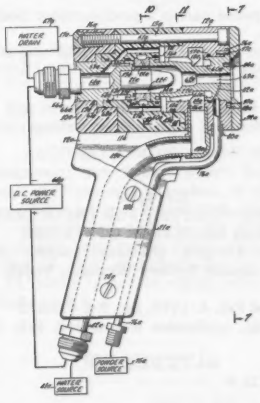
COATING HEAT SOFTENED PARTICLES BY PROJECTION IN A PLASMA STREAM OF MACH 1 TO MACH 3 VELOCITY

Erich Muehlberger, Costa Mesa, Calif., assignor to Geotel, Inc., Amityville, N.Y.

Continuation-in-part of Ser. No. 143,956, May 17, 1971, abandoned, and a continuation-in-part of Ser. No. 372,260, June 21, 1973, Pat. No. 3,823,302, which is a continuation of Ser. No. 214,584, Jan. 3, 1972, abandoned. This application Aug. 6, 1973, Ser. No. 386,036

Int. Cl. B23k *9/04*

U.S. Cl. 219—76 **6 Claims**



1. The method of projecting high velocity particles onto a substrate to coat the same, comprising the steps of:

establishing a plasma stream,

expanding said plasma stream from the throat to the exit of a supersonic nozzle having a ratio of exit area to throat area sufficient to achieve a plasma stream exit velocity greater than Mach 1 and less than Mach 3,

injecting into said plasma stream a stream of particles to be projected, said particles having a diameter not greater than about 44 microns,

heating said particles to a temperature near but less than their melting point, said last-mentioned step comprising controlling the time of dwell of said particles within said plasma stream by selectively controlling both the angle and position of injection of said particles into said stream substantially at the throat of said nozzle, whereby said particles will be softened, but not melted, and will obtain a velocity that is substantially maximized with respect to the velocity of said plasma stream, and

impinging said softened particles against a substrate to thereby coat said substrate.

3,914,574

FABRICATED PISTON WITH SPRAYED GROOVE

Harold Taylor Hill, and Robert Munro, both of Lyminton, England, assignors to Wellworthy Limited, Lymington, England

Filed Oct. 1, 1973, Ser. No. 402,104

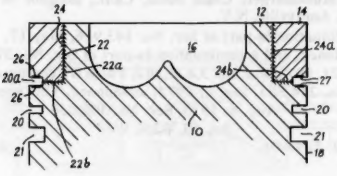
Int. Cl.² B23K *15/00;* **B23P** *15/10;* **F16J** *1/00*

U.S. Cl. 219—121 EM **7 Claims**

1. A method of manufacturing a light metal piston having a

circumferentially extending piston ring groove, which method comprises the steps of

producing a main cylindrical piston part having a reduced diameter portion at its head end, and an annular piston part adapted to fit over said reduced diameter portion, with each of said parts having a lateral surface defining substantially the whole of one side of said piston ring groove when said annular piston part is fitted onto said



cylindrical piston part in a predetermined position relative thereto,

spraying a wear-resistant coating material onto at least one of said lateral surfaces before said parts are fitted together, and

subsequently fitting said parts together in said predetermined position, and electron beam welding them to each other.

3,914,575

POWER SUPPLYING DEVICE FOR THE OPERATION OF A GAS DISCHARGE CONTAINER

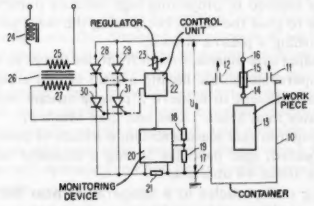
Walter Eichler, Cologne, Germany, assignor to Elektophysikalische Anstalt Bernard Berghaus, Vaduz, Liechtenstein

Filed Feb. 6, 1974, Ser. No. 439,872

Claims priority, application Switzerland, Feb. 19, 1973, 2357/73

Int. Cl. B23k *9/00*

U.S. Cl. 219—121 P **3 Claims**



1. In a power supplying device for the operation of a gas discharge container, particularly an ionitriding container, containing metallic workpieces to be treated, said device being supplied from an alternating-current power source, comprising a transformer, the primary circuit of which is connected to said power source, a rectifying device comprising controlled rectifiers, the input of said rectifying device being connected to the secondary circuit of said transformer, the output of said rectifying means providing direct operating voltage between said workpieces and the housing of said container, a monitoring device connected between said workpieces and said container for monitoring said operating voltage and the operating current, the output of said monitoring device being connected to the input of a regulating and switching device for said operating voltage, the output of said regulating and switching device being connected with said rectifying device in combination, the improvement comprising:

a. said rectifying device comprising a full-wave bridge having four controlled rectifier elements, performing across one bridge diagonal a full wave direct operating voltage while the other diagonal of said bridge is connected to the terminals of said secondary circuit of said transformer, pairs of controlling electrodes of said rectifiers being interconnected and connected to said output of said regulating and switching device; and

b. an inductance connected in series with said primary circuit such that the start of each wave of the operating voltage following every zero passage is retarded by a period of time in the range of 2 – 7 milliseconds.

3,914,576

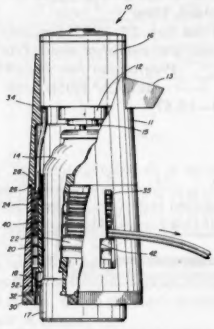
REEL FOR STORING AN ELECTRICAL LINE CORD

John T. Ciaffone, Bridgeport, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed May 6, 1974, Ser. No. 467,330

Int. Cl.² H05B *1/00*

U.S. Cl. 219—214 **2 Claims**



1. A dispenser for heating a product from a replaceable container comprising:

a. means for heating the product,

b. a hollow shell connected to and extending downwardly from said heating means, said shell having an opened bottom end for receiving the container therein,

c. a channel helically formed on an outer surface of said shell,

d. a sleeve concentrically aligned with said shell and enclosing said channel,

e. a slotted perforation formed in said sleeve and extending across said channel,

f. means for rotatably interconnecting said sleeve and shell, and

g. an electrical line cord extending from said heating means between said sleeve and said shell into one end of said channel and from said channel outwardly through said perforation,

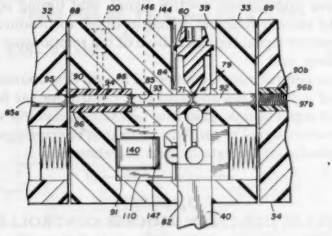
h. said sleeve being held by one hand of a user and said electrical cord being pulled outwardly by the other hand of the user to unwind said electrical cord from said channel as said shell rotates in one direction, and

i. said sleeve being held by one hand of the user and said shell being rotated by the other hand of the user in a direction opposite said one direction to wind said electrical cord in said channel.

3,914,577
VOTING MACHINE

Cothburn M. O'Neal, Dallas; Alfred M. Mayo, Richardson, both of Tex., and George William Childs, deceased, late of Dallas, Tex. (by Patricia M. Childs, executrix), assignors to Riverside Press, Inc., Dallas, Tex.

Division of Ser. No. 309,174, Nov. 24, 1972, Pat. No. 3,866,826. This application May 28, 1974, Ser. No. 473,927
Int. Cl.² G07C *13/00*
U.S. Cl. 235—54 A 9 Claims



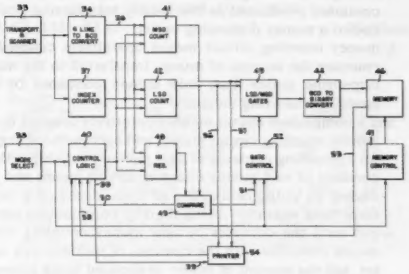
1. A voting machine comprising:
a frame member having a multiplicity of elongated voting keys arranged in substantial alignment in at least two adjacent columns having adjacent keys, said keys manually slidable relative to said frame member from a non-voted to a voted position;
a cross bore in said frame member substantially perpendicular to the direction of movement of said keys;
cam means associated with said keys at said cross bore;
plunger means positioned in said cross bore and arranged relative to said cam means whereby actuation of one of said keys to a voted position causes said cam means on said voted key to displace said plunger means and whereby said plunger means can be moved into a blocking position at the cam means of an adjacent key in a non-voted position thereby preventing actuation of said non-voted adjacent key; and
interlock means positioned in said bore between said adjacent keys having first means preventing the movement of said plunger means to said blocking position and second means transferring the movement of said plunger means to said blocking position whereby said interlock means can be positioned to establish an interlocked selection group including a predetermined number of adjacent keys.

3,914,578
APPARATUS FOR AND METHOD OF AUDITING BUSINESS RECORDS

Arthur G. Bigelow, Dublin; Wilbur W. Bigelow, Pleasanton, and Gale E. Stone, Sunnyvale, all of Calif., assignors to Checkpoint Systems, Inc., Hayward, Calif.

Filed July 19, 1973, Ser. No. 380,896
Int. Cl.² G06K *7/10, 19/06*
U.S. Cl. 235—61.7 R 16 Claims

1. Apparatus for auditing documents which are sequentially numbered, comprising:
a. sensing means for sensing numeric information from each of such documents,
b. first means responsive to said sensing means for storing the numeric information corresponding to the lowest numbered of such documents,
c. second means responsive to said sensing means for storing the numeric information corresponding to the highest numbered of such documents,
d. means for comparing the information in said first storing means with the information in said second storing means,
e. means responsive to said comparing means for adding sequentially a count of "1" to the numeric information contained in said first storing means for providing numeric information representative of a sequence of numbers between the lowest numbered of such documents and the highest numbered of such documents,

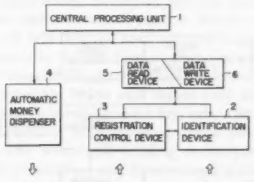


f. a memory, and
g. means for entering the numeric information provided by said first storing means into said memory.

3,914,579
AUTOMATIC MONEY DISPENSER

Hideto Shigemori; Akio Ueba; Motoaki Fukunaga; Hisashi Kitakami, and Takayoshi Yamashita, all of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Japan

Filed Dec. 18, 1973, Ser. No. 425,828
Claims priority, application Japan, Dec. 21, 1972, 47-127693; Dec. 21, 1972, 47-127695; Dec. 23, 1972, 47-2259
Int. Cl.² G07F *7/04, 7/08;* G06K *5/00;* G07F *9/02*
U.S. Cl. 235—61.7 B 5 Claims



1. An automatic money dispenser adapted to be utilized in combination with a central processing unit, which comprises:
a transfer-flag circuit means operatively coupled to said central processing unit for forming a transfer-flag signal rersponsive to a data transmission starting signal and a data transmission ending signal which are applied to said automatic money dispenser respectively before and after money dispensing data arrives from said central processing unit;
a memory register operatively coupled for storing said money dispensing data based on said transfer-flag signal provided by said transfer-flag circuit means;
a strobe circuit means operatively coupled to said transfer-flag circuit means and to said central processing unit for receiving said transfer-flag signal and data pulses applied in synchronization with said money dispensing data to produce strobe signals at predetermined times based on the data shift pulses;
a memory check circuit means operatively coupled for discriminating, on the basis of said money dispensing data and said strobe signals, digits of said money dispensing data stored in said memory register, to detect monetary denominations necessary for the dispensation of a designated amount of money;
a money container setting means operatively coupled to said memory check circuit means and to a group of

money containers which respectively contain money of different denominations for moving a selected one of said group of money containers to a money transferring position, said selected money container corresponding to the monetary denomination thus detected;

a money transferring means located adjacent said money container positioned at the money transferring position and to a money dispensing outlet;

a money counting circuit means operatively coupled for counting the amount of money transferred to the money dispensing outlet from said money container by said money transferring means;

and a comparison circuit means operatively coupled to said money counting circuit means and said memory register for comparing contents of said memory register with the contents of said money counting circuit means and producing an output indicative of coincidence, the money dispensing operation being thereby continuously carried out until the contents of said money counting circuit means coincides with the contents of said memory register, and the amount of money designated being automatically dispensed in accordance with command signals from the central processing unit.

3,914,580
TIMING CONTROL CIRCUIT FOR ELECTRONIC FUEL INJECTION SYSTEM

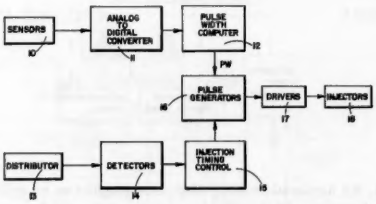
George A. Watson, Tustin, and John J. Bollinger, Orange, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 25, 1973, Ser. No. 354,296

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] G06M 3/02

U.S. Cl. 235—92 MT **21 Claims**



1. In combination,

signal supplying means for supplying signals having varying periodicity,

first means connected to said signal supplying means for producing a first control signal representative of the periodicity of signals supplied thereby,

second means connected to said signal supplying means for producing a second control signal representative of the periodicity of signals supplied thereby,

first counter means for producing a first function signal,

said first counter means connected to said first means to receive said first control signal to establish a first condition in said first counter means,

said first counter means connected to said second means to receive said second control signal to establish a different condition in said first counter means,

timer means for producing a timing signal,

said timer means connected to said second means to receive said second control signal to establish a first condition in said timer means,

second counter means for producing a second function signal,

said second counter means connected to said second means to receive said control signal to establish a first condition in said second counter means,

said second counter means connected to said timer means to receive said timing signal,

input means for supplying input signals,

said input means connected to said second counter such that said timing signal and said input signals control the operation of said second counter means,

first control means connected to said second means, to said timing means and to said second counter means to receive said second control signal, said timing signal and said second function signal in order to produce a third function signal representative of the relationship therebetween, and

output control means connected to said first counter means, said input means and said first control means to receive said input signals, said first function signal and said third function signal to produce an output control signal representative of the relationship therebetween.

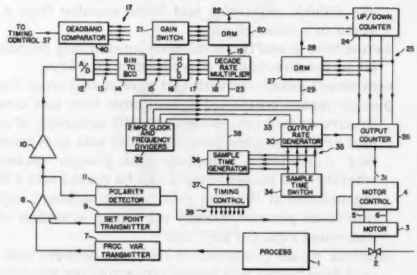
3,914,581
PULSE DURATION PROCESS CONTROLLER

Anton Gilson, Greece, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed Mar. 9, 1973, Ser. No. 339,542

Int. Cl.[2] G05D 23/00, 7/00

U.S. Cl. 235—92 CT **5 Claims**



1. A process controller comprising, in combination,

an analog input means for receiving an input signal and producing a first output signal representing the absolute magnitude of said input signal and a second output signal representing the sense of said input signal;

a first conversion means for receiving said first output signal and converting it to a first set of digital signals representing a first number corresponding to said absolute magnitude;

a second conversion means for receiving said first set of digital signals and being responsive thereto for producing a first train of pulses corresponding to said first number; and up/down counter means for receiving said first train of pulses and counting them up, and, while counting them up, producing a second set of digital signals representing a second number corresponding to the up-count at any instant;

a third conversion means for receiving said second set of digital signals and converting it to a second train of pulses representative of said second number;

said up/down counter means being connected to said third conversion means for receiving said second train of pulses and down-counting them while up-counting said first train;

an output counter connected to said up/down counter to receive said second set of digital signals for counting the number represented thereby down;

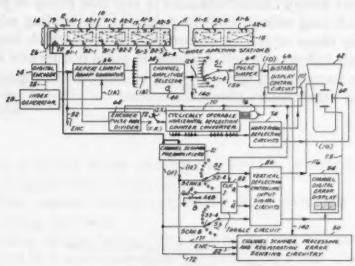
a rate generator means operable to set the rate at which said output counter counts down, and control means respon-

sive to said output counter counting down for producing a control effect proportional to the time it takes to count the last said number down, said control means being also responsive to said second output signal for causing said control effect to have the sense of said input signal.

3,914,582
DISPLAY SYSTEM AND METHOD FOR REGISTRATION CONTROL EQUIPMENT

Daniel A. Coberley, Danville, and Mark Resh, Urbana, both of Ill., assignors to Hurletron Altair, Danville, Ill.

Filed May 28, 1974, Ser. No. 473,707
Int. Cl.² G06M *3/02*
U.S. Cl. 235—92 MP **6 Claims**



1. A display system for use with equipment involving coordinated mechanical movements during the operation thereof, comprising,

an encoder for coupling with mechanical movement in the equipment and operable for generating encoder pulses as a function of successive uniform increments of the mechanical movement coupled thereto,

display apparatus having a visual display and having a first scanning control input for producing scanning along a first coordinate axis in successive scanning cycles of the display and having a second scanning control input for producing display of input signals with respect to a second coordinate axis of the display,

a cyclically operable deflection counter converter connected with said encoder and operable for cyclically generating a first deflection signal as a function of the mechanical movement coupled to the encoder, and connected with said first scanning control input of said display apparatus and operable in response to an actuating signal for supplying said first deflection signal thereto to control a scanning cycle of said display apparatus,

input signal means responsive to mechanical movement to be coordinated with the mechanical movement coupled to said encoder to produce cyclically occurring input signals and connected with said second scanning control input to supply said input signals thereto,

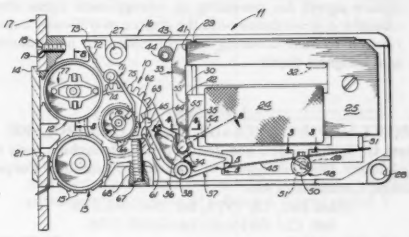
a cyclically operable ramp generator connected with said encoder and responsive to successive encoder pulses from said encoder to produce a ramp output incrementally changing in amplitude over a given amplitude range in each cycle of operation, and

an amplitude selector progressively adjustable to any selected amplitude setting corresponding to any of the amplitudes of said ramp output within said amplitude range and operable to generate an actuating signal in each cycle of operation of the ramp generator when the amplitude of the ramp output reaches the selected amplitude setting, and connected with said deflection counter converter to supply said actuating signal thereto and thus to initiate the successive scanning cycles of said display apparatus in accordance with the selected amplitude setting of said amplitude selector.

3,914,583
DECADE OR THE LIKE AND COMPONENTS THEREOF

Robert E. Einem, Northridge, and Raymond Vertefeuille, Lakeview Terrace, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed July 17, 1972, Ser. No. 272,421
Int. Cl.² G06M *1/10, 1/276*
U.S. Cl. 235—92 C **23 Claims**

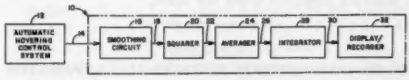


1. An incremental drive mechanism comprising: a base; an electromagnet fixed relative to said base, said electromagnet having a ferromagnetic core with a conductive winding thereabout said core having one end located in a predetermined position; a nonmagnetic arm; means mounting said arm on said base in a position pivotable about a first axis fixed relative to said base but otherwise in a fixed position relative to said base in a direction along said first axis, said arm having a recess therein; a ferromagnetic clapper having an enlargement on one end thereof trapped in said recess, said base having a portion extending over one end of said recess to trap said clapper enlargement, said arm having a portion extending over the other end of said recess to trap said clapper enlargement, said clapper having a shank portion connected with said enlargement, said recess having an opening between the ends thereof larger than said shank portion thereat to permit limited rotation of said clapper, said opening being smaller than said enlargement to trap said enlargement in said recess, said arm and said clapper being constructed to cause said enlargement to be rotatable inside said recess only about a second axis approximately parallel to said first axis, said clapper being located in a position such that said shank portion is drawn toward said core when said winding is energized; a toothed ratchet wheel pivoted on said base; means on said arm positioned to rotate said ratchet wheel an integral number of teeth each time said winding is energized and subsequently deenergized; and spring means to bias said arm in a direction toward said ratchet wheel.

3,914,584
WAVE ENERGY TRANSLATOR

Edward F. Pietras, Norwich, and Elric J. Nelson, Niantic, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 25, 1974, Ser. No. 526,489
Int. Cl.² G06G *7/70, 7/26*
U.S. Cl. 235—150.2 **8 Claims**



1. A wave energy translator apparatus for use in conjunction with a submarine hovering control system providing an acceleration signal which changes in relation to displacement of the submarine from an assigned depth, said apparatus comprising:

smoothing circuit means, connected to receive said acceleration signal, for providing a smoothed acceleration signal;

squaring circuit means, connected to receive said smoothed acceleration signal, for providing a squared signal that changes in proportion to the square of said smoothed acceleration signal;

averaging circuit means, connected to receive said squared signal, for providing a mean square signal; and

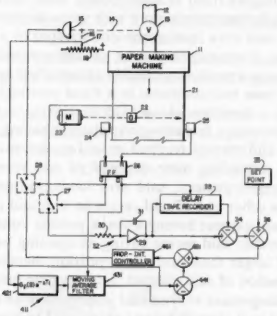
integrator circuit means, connected to receive said mean square signal, for providing an energy state signal that changes in accordance with the degree of difficulty experienced by said hovering control system in maintaining said assigned depth.

3,914,585

SHEET MOVING AVERAGE FILTER CONTROLLER

Robert G. Wilhelm, Jr., and John Francis Donoghue, both of Columbus, Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio

Filed Feb. 13, 1974, Ser. No. 442,172
Int. Cl.² G01N *33/34*; G01B *7/06*
U.S. Cl. 235—151.3 **29 Claims**



29. In an apparatus for controlling a characteristic of a moving sheet affected by a processing machine in response to measurements of a sheet property provided by measuring means on successive scans across a substantial width of a sheet in a direction between the sheet edges, means for producing a moving average of the measurements, said average including a number of measurements from a current scan and from one previous scan which is equal to the number of measurements obtained on one complete scan across said substantial width, means correlated with the location across the sheet width of the measurement currently being taken by said measuring means for selecting the measurements from said current scan and said previous scan so as progressively to decrease the number of measurements from the previous scan and to increase the number of measurements from the current scan included in the current value of the moving average as the more current measurements are made, and means responsive to the moving average for deriving a signal for controlling said machine so as to influence the value of said characteristic in the machine direction along the sheet.

3,914,586

DATA COMPRESSION METHOD AND APPARATUS

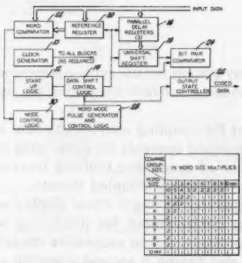
Duane E. McIntosh, Santa Ynez, Calif., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 25, 1973, Ser. No. 409,607
Int. Cl.² G06F *5/00*
U.S. Cl. 235—154 **8 Claims**

1. Apparatus for encoding successive identical groups of bits of binary data comprising:

clocking means for forming a plurality of bit cells of uniform time durations and for defining the leading edge and midpoint of each bit cell, and

bit pair encoder means responsive to the first of said successive groups of binary data and to said clocking means and comprising parallel in serial out shift register means for storing said groups of bits and gate means for detecting the binary character of adjacent uncoded bits shifted through said register means, said gate means responding to those bits of one binary characterization in said first group of bits by producing first control pulses at the midpoint of only those of the corresponding bit cells which immediately follow a bit cell in which no pulse occurs and which are immediately followed by a bit cell containing a bit of said one binary characterization, said gate means further responding to those of said bits of the other binary characterization in said first group of bits by producing second control pulses at the leading edge of only those of the corresponding bit cells which immediately follow a bit cell in which no pulse occurs and which are immediately followed by a bit cell containing a bit of said other binary characterization,



detector means for detecting the number of said successive groups of bits,

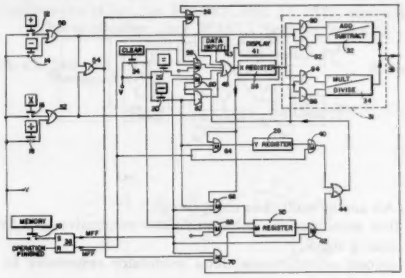
signal generating means responsive to the number of said successive groups, and to the state of the last bit of said first group of bits by producing third control pulses, said third control pulses consisting of five pulses, the first pulse occurring at the trailing edge of the bit cell corresponding to the last bit of said first group of bits, the second pulse occurring at least two bit cells displaced from said first pulse and occurring at the midpoint or leading edge of a bit cell depending upon whether the state of the last bit of said first group of bits is said one or said other binary characterization respectively, the third pulse displaced from said second pulse by 1½ bit cells, the fourth pulse displaced from said third pulse by 1½ bit cells, and the fifth pulse displaced from said fourth pulse by an amount which exceeds 1½ bit cells by a multiple of ½ bit cells for each group of bits following said first group of bits,

output state controller means for providing a bistable output signal containing transitions between separately identifiable states in response to either of said first, second or third control pulses.

3,914,587
CALCULATOR HAVING A MEMORY PRESET KEY

Ralph W. Haines, Sunnyvale, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 29, 1974, Ser. No. 456,414
Int. Cl.² G06F 7/38
U.S. Cl. 235—156 7 Claims



1. In a device which performs a plurality of operations on data, a combination comprising:

a first register having respective input terminals and an output terminal;

flip-flop means having first and second output terminals, said first output terminal for providing a first true signal when said flip-flop means is in a set state, said second output terminal for providing a second true signal when said flip-flop means is in a reset state, said flip-flop means being in said reset state upon completion of every operation;

actuation means connected to said flip-flop means for placing said flip-flop means in said set state;

operation means for selectively providing a plurality of respective third true signals;

first gate means having respective inputs connected to said operation means and said first output terminal of said flip-flop means, said first gate means having respective outputs connected to said respective input terminals of said first register, said first gate means for permitting entry of data into said first register upon application of one of said respective third true signals to said first gate means provided said flip-flop means is in a set state; and second gate means connected to said first output terminal of said flip-flop means and said output terminal of said first register, said second gate means for permitting transfer of data from said first register to other parts of the device provided said flip-flop means is in a set state.

3,914,588
DIGITAL FILTERS

Henri J. Nussbaumer, La Gaude, France, assignor to International Business Machines Corporation, Armonk, N.Y.

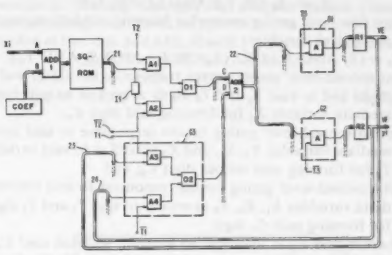
Filed Dec. 3, 1974, Ser. No. 529,205
Claims priority, application France, Dec. 11, 1973, 7345377
Int. Cl.² G06F 7/38
U.S. Cl. 235—156 3 Claims

1. A digital filter for generating processed output samples of a signal Y from input terms representing sequential values of samples of an input signal X, said filter comprising:

a. means for algebraically and cyclically adding sequences of predefined coefficients to the sequence of terms representing the latest values of samples of the data to be filtered;

b. a memory storing the squares of the values of all possible sums resulting from the operations performed by said adding means;

c. addressing means for said memory to receive one of said sums from said adding means and to control readout from said memory of the corresponding square value; and

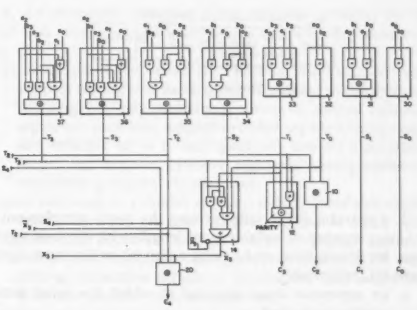


d. means for accumulating said square values fetched from said memory during each of said sequences to provide a corresponding sample of a filtered output signal Y.

3,914,589
FOUR-BY-FOUR BIT MULTIPLIER MODULE HAVING THREE STAGES OF LOGIC CELLS

James R. Gaskill, Jr., Pacific Palisades, and Lawrence R. Weill, Seal Beach, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed May 13, 1974, Ser. No. 469,131
Int. Cl.² G06F 7/52
U.S. Cl. 235—164 5 Claims



1. A 4 by 4 bit multiplier for multiplying a first 4-digit binary number

$$A = A_0 = 2 \cdot A_1 + 4 \cdot A_2 + 8 \cdot A_3$$

by a second 4-digit binary number

$$B = B_0 + 2 \cdot B_1 + 4 \cdot B_2 + 8 \cdot B_3$$

to form an 8-digit binary product

$$C = C_0 + 2 \cdot C_1 + 4 \cdot C_2 + 8 \cdot C_3 + 16 \cdot C_4 + 32 \cdot C_5 + 64 \cdot C_6 + 128 \cdot C_7,$$

said multiplier comprising:

a first set of gating means for forming the individual digits S_0, S_1, S_2, S_3, S_4, S_5 of a 6-digit binary number

$$S = (B_0 \cdot 2 \cdot B_1) \cdot (A_0 + 2 \cdot A_1 + 4 \cdot A_2 + 8 \cdot A_3) = S_0 + 2 \cdot S_1 + 4 \cdot S_2 + 8 \cdot S_3 + 16 \cdot S_4 + 32 \cdot S_5;$$

a second set of gating means for forming the individual digits T_0, T_1, T_2, T_3, T_4, T_5 of a 6-digit binary number

$$T = (A_0 + 3 \cdot A_1 + 4 \cdot A_2 + 8 \cdot A_3) \cdot (B_2 + 2 \cdot B_3) = T_0 + 2 \cdot T_1 + 4 \cdot T_2 + 8 \cdot T_3 + 16 \cdot T_4 + 32 \cdot T_5;$$ and

a 6 by 4 bit adder for forming the sum of said 6-digit binary number T and a second 4-digit binary number formed from the 4 most significant digits of said 6-digit binary number S to form the 6 most significant digits of said 8-digit number, said adder comprising:

first first-level gating means for forming a first intermediate logical variable

$X_1 = (S_3$ AND $T_3)$ OR $((S_3$ OR $T_3)$ AND $(S_4$ AND $T_3))$;

second first-level gating means for forming a second intermediate logical variable

$$X_2 = (S_5 \text{ OR } T_3) \text{ AND } (S_4 \text{ OR } T_2);$$

third first-level gating means for forming a third intermediate logical variable

$X_3 = (S_3 \text{ AND } T_1) \text{ OR } ((S_3 \text{ OR } T_1) \text{ AND } S_2 \text{ AND } T_0)$;

first second-level gating means responsive to said S_4 and S_5 digits and to said T_2 and T_3 digits as well as to said intermediate variable X_3 for forming said digit C_5;

second second-level gating means responsive to said intermediate variables X_1, X_2, and X_3 as well as to said variable T_4 for forming said output digit C_6; and

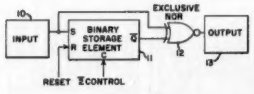
third second-level gating means responsive to said intermediate variables X_1, X_2, X_3 as well as to said T_4 and T_5 digits for forming said C_7 digit;

wherein said C_0 is identical to said S_0, wherein said C_1 is identical to said S_1, and wherein said digits C_2, C_3, C_4, C_5, C_6, and C_7 are the outputs of said adder.

3,914,590
SERIAL TWO'S COMPLEMENTER

John M. Irwin, Clay, and Noble R. Powell, Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Nov. 4, 1974, Ser. No. 520,542
Int. Cl.² G06F 5/02; H03K 13/25
U.S. Cl. 235—164 8 Claims



1. Apparatus for serially forming the two's complement of a binary number of variable word length, with the least significant bit first in time, and having a sign bit as the most significant bit, comprising:

a. an apparatus input terminal to which the serial binary number is applied,

b. an apparatus output terminal from which the two's complement is derived,

c. a binary storage element having set and reset input connections and a complementary output connection,

said set input connection being coupled to said apparatus input terminal, said reset input connection being coupled to reset means to reset said binary storage element during the time of the least significant bit for each word,

said binary storage element responding to a 1 set signal, and being clocked to produce a change in output after a one bit delay,

d. an exclusive NOR gate having two input connections and an output connection,

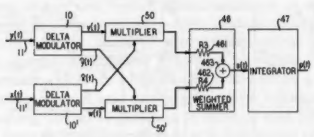
one input connection being coupled to said apparatus input terminal, the other input connection being coupled to the complementary output of said binary storage element; and the output connection being coupled to said apparatus output terminal,

said exclusive NOR gate inverting the bit stream at the apparatus input terminal when the complementary output of the binary storage element goes to the zero state in response to a 1 in a serial binary number and producing a two's complement of said number at the apparatus output terminal.

3,914,591
ANALOG ELECTRONIC MULTIPLIER

Benjamin Franklin Logan, Jr., Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 19, 1974, Ser. No. 462,293
Int. Cl.² G06G 7/16
U.S. Cl. 235—194 9 Claims



1. An analog multiplier comprising:

a first asynchronous delta modulator responsive to a first analog signal;

a second asynchronous delta modulator responsive to a second analog signal;

first switching means, controlled by the output signal of said second modulator, responsive to said first analog signal and its algebraic negative for commutating between said first analog signal and its negative;

second switching means, controlled by the output signal of said first modulator, responsive to said second analog signal and its algebraic negative for commutating between said second analog signal and its negative;

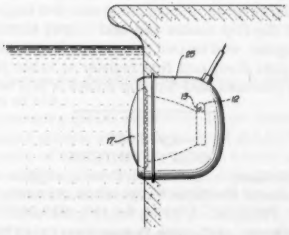
means for algebraically combining the output signals of said first and second switching means; and

integration means responsive to said means for combining for developing a signal representative of the product of said first analog signal and said second analog signal.

3,914,592
UNDERWATER LIGHT CIRCUIT

Eugene R. Maxey, Valinda, Calif., assignor to Purex Corporation, Lakewood, Calif.

Filed Sept. 3, 1974, Ser. No. 502,903
Int. Cl.² F21V 31/00
U.S. Cl. 240—26 7 Claims



1. In an underwater light circuit,

a. a pair of terminals across which AC power is applicable,

b. a pair of electrodes exposed for contact with the water, one electrode electrically connected with one of said terminals,

c. a network including resistance and capacitance connected in series between the other of said electrodes and the other of said terminals,

d. an electric lamp having a filament and a gate controlled switch connected in series with the filament between said terminals, and

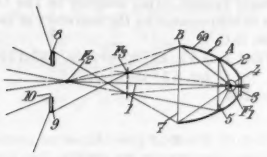
e. means electrically connected between said network and the gate of said switch to effect turn-on of said switch in

response to predetermined charging of said capacitance occurring when current passes between said electrodes.

3,914,593
MOTOR VEHICLE HEADLIGHTS

Armand Laribe, Saint-Cere, France, assignor to Jean Freitag, Dijon, France, a part interest

Continuation of Ser. No. 174,083, Aug. 23, 1971, abandoned. This application June 8, 1973, Ser. No. 368,130
Int. Cl. F21v 7/00
U.S. Cl. 240—41.35 R 8 Claims



1. A dipped-beam headlight for a motor vehicle, which headlight comprises a reflector, a light source disposed at or near the focus of the said reflector, and a device adapted to intercept at least a major portion of that part of the beam of light emitted by the said source which would be directed upwardly by the said reflector in the absence of said device, said reflector comprising, first and second parts, said first part comprising a dome-shaped segment whose surface is a surface of an elongate ellipsoid of revolution, this dome-shaped segment defining a rear part of the reflector, said second part comprising a forward part, connected to said rear part along the forward circumference of said segment, this forward part including ellipsoidal surfaces, distinct from the surface of said ellipsoid of revolution, which ellipsoidal surfaces define the forward portion of the reflector, the assembly being such that the section of the ellipsoidal surfaces through the plane containing the major axis of said ellipsoid of revolution contains two elliptical arcs, each of which has a first focus which coincides with the first focus of the ellipsoid and a second focus situated on the straight line joining the second focus of the ellipsoid to the junction point of the corresponding elliptical arc with the elliptical arc constituting the section of the said dome-shaped segment through the plane containing the major axis of the ellipsoid,

wherein a deformation has been imparted to the dome-shaped segments such that it has the form of an oval the major axis of which is horizontal, this major axis being greater than the initial diameter of the circumference by about 0,05 times the initial radius of said circumference, and that said device has the form of a screen-cup situated under the light source,

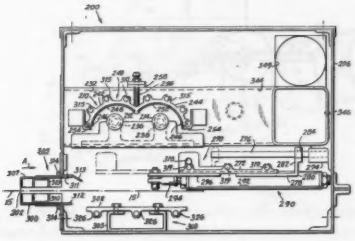
said reflector being such that the rear and forward parts form two distinct elements and that the first focus of said ellipsoid is situated inside the dome-shaped segment, said second focus of this ellipsoid being situated outside the reflector, the second focus of said elliptical arc being situated inside the straight line segment connecting the second focus of the ellipsoid to the junction point, this second focus of the elliptical arc being distinct from the second focus of the ellipsoid and being situated outside the reflector,

said headlight including a mask disposed forwardly of the said reflector so that the mask, at least partially masks for the driver of an on-coming vehicle the upper part of the reflector.

3,914,594
RADIATION LAMP REFLECTOR ASSEMBLY

Norman A. Helding, Chicago, Ill., assignor to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 342,816, March 19, 1973. This application Apr. 24, 1974, Ser. No. 463,513
Int. Cl.² F21V 7/00
U.S. Cl. 240—41.35 2 Claims



1. An ultraviolet radiation lamp reflector assembly for at least two ultraviolet radiation lamps, said assembly comprising:

a unitary, unbroken, sheet-like, reflector insert support; said support having one surface that is defined in the form of two neighboringly positioned, concavely shaped cylinder segments; each said support cylinder segment being open and oriented so as to face generally toward a common focus; said support cylinder segments having different respective generally parallel axes;

each said support cylinder segment having outer side edges extending along its said cylinder segments; along said outer side edges of each said support cylinder segment are defined respective facing support channels for supporting respective reflective inserts one said insert for each said support cylinder segment;

a respective reflector insert inserted in each said support cylinder segment; each said insert being shaped in the form of and to fit into its said support cylinder segment; each said insert being thin in its thickness dimension; each said insert having side edges emplaced in and supported by the respective said support channels of that said support cylinder segment; each said insert has an exterior side that is shaped to conform to and that seats against the interior of the respective said support cylinder segment; each said insert having an interior side that is shaped as a concave cylindrical segment and that extends around said axis of the respective said support cylinder segment; each said insert being comprised of ultraviolet light reflective material;

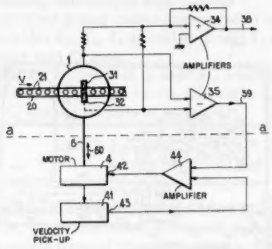
cooling means extending across the entire said support, thereby to cool said support;

a respective ultraviolet radiation lamp for each said insert and being positioned within the arc defined by the said support cylinder segment; each said lamp being elongated and being oriented parallel to said axis of the respective said support cylinder segment and extending along the length thereof; each said lamp being positioned to enable it to emit radiation toward its respective said reflective insert and to cause the reflected radiation to be reflected back generally toward the common focus of said support cylinder segments.

3,914,595
OPTICAL DEVICE FOR READING-OUT A TRACK CARRIED BY A MOVING DATA CARRIER

Claude Tinet, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 23, 1973, Ser. No. 335,429
Claims priority, application France, Feb. 29, 1972, 72.06886
Int. Cl.² G05B *1/00*
U.S. Cl. 250—202 **13 Claims**

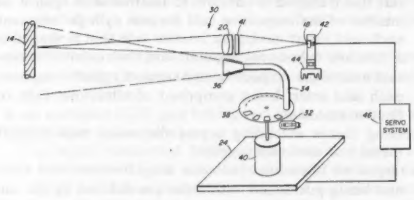


1. Optical device for reading out a track positioned on the recorded face of a moving data carrier, said optical device comprising a housing, means for illuminating a portion of said track, optical stigmatic means for projecting onto a detection plane an image of the illuminated portion of said track, photoelectric means fixed to said housing and positioned in said detection plane for sensing the displacement of said image along a first direction crossing the axis of said track, motor means for displacing said optical stigmatic means in relation to said housing along a second direction; said second direction being parallel to said recorded face and arranged for crossing said axis, and feedback electric means for controlling said motor means in relation to the voltage supplied from said photoelectric means; said motor means being mechanically ganged with a velocity sensor; said feedback electric means including a velocity loop fed from said velocity sensor.

3,914,596
INDUSTRIAL AUTOMATION LOCATING AND TRACKING SYSTEM

Joel Roberts Finkel, Wayland; E. Evert Basch, Newton, and Edwin R. Bowerman, Topsfield, all of Mass., assignors to GTE Laboratories, Incorporated, Waltham, Mass.

Filed July 24, 1974, Ser. No. 491,593
Int. Cl.² G01J *1/20*
U.S. Cl. 250—203 **17 Claims**

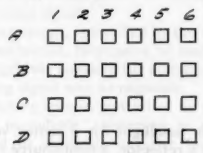


1. An apparatus for tracking a moving object in an industrial automation system comprising
   a support movable generally parallel to the movement to the object,
   a light source mounted on the support and directing a beam of light toward the object,
   a retroreflective element mounted on the object,
   a position-sensitive photodetector mounted on the support, means disposed on the support adjacent to the light source for focusing light reflected by the retroreflective element onto the position-sensitive photodetector, the position of the focus of the light on the position-sensitive photodetector and the output therefrom being indicative of the relative positions of the object and the support, and means responsive to the output from the position-sensitive photodetector for bringing the support into synchronous movement with the moving object.

3,914,597
SYSTEM FOR ADJUSTING INDIVIDUAL SENSORS IN AN ARRAY

Irving Kaufman, Tempe, Ariz., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed July 12, 1974, Ser. No. 488,129
Int. Cl.² G01J *21/32*
U.S. Cl. 250—204 **5 Claims**



1. A system for adjusting the effective sensitivities of a multiplicity of sensors in an array comprising:
   a. a first shift register having a multiplicity of stages, one each being fed to one of the multiplicity of sensors in the array;
   b. a light source directed at the array of sensors;
   c. a plate of transparent ferroelectric material interposed between a source of light and the array of sensors;
   d. a second shift register having a multiplicity of stages;
   e. a multiplicity of transparent electrical contacts affixed to the plate of ferroelectric material with each of the contacts fed by one of the stages of the second shift register, the contacts dividing the ferroelectric material into a multiplicity of elements corresponding with the multiplicity of sensors;
   f. a level reference source; and
   g. a comparator fed by the level reference source and the common output of the first shift register with the output of the converter being fed to the common input of the second shift register.

3,914,598
PHOTOCELL CONTROLLED CIRCUIT

Ezra L. Schacht, and Daniel Jay Schacht, both of 1620 W. Main St., Houston, Tex. 77006

Filed June 27, 1974, Ser. No. 483,032
Int. Cl.² H01H *47/24*, *61/013*
U.S. Cl. 250—206 **22 Claims**

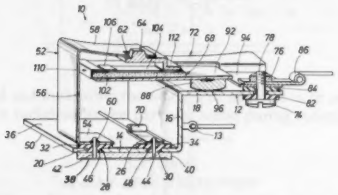
1. A light responsive, photocell controlled electrical switch comprising:
   a supporting frame;
   first electrical contact means carried by said frame, said first contact means adaptable for connection to a load;
   a metallic heat-responsive element insulatively carried by said frame, said element having a temperature-movable portion;
   second electrical contact means carried by said temperature-movable portion of said element, said second contact means adaptable for connection to a power source;

heating means for controlling the temperature of said temperature-movable portion of said element, said heating means comprising:

an electrically-nonconductive substrate, said substrate having a top surface and a bottom surface, said substrate being movable with said temperature-movable portion;

a resistive coating carried by said top surface of said substrate;

a bottom terminal on said bottom surface of said substrate in electrical communication with said resistive coating,



said bottom terminal being operable to maintain slidable electrical and mechanical contact with said heat-responsive element;

a top terminal on said top surface of said substrate in electrical communication with said resistive coating; and

photocell means insulatively mounted on said frame having one terminal electrically connected to said top terminal for controlling an amount of electric current delivered to said resistive coating from the power source, the other terminal of said photocell means being adaptable for connection to ground.

3,914,599

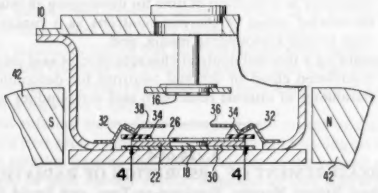
PHOTOMULTIPLIER WITH REDUCED DARK CURRENT

Richard S. Enck, Jr., Mountain View, Calif.; Ronald H. Goehner, Wayne, N.J., and Gordon Noel Guy, Campbell, Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed Mar. 18, 1974, Ser. No. 452,151

Int. Cl.² H01J *39/12, 39/14, 43/00*

U.S. Cl. 250—207 **11 Claims**



1. In a crossed-field photomultiplier of the type comprising a photocathode for emitting electrons in response to a light input, an elongated dynode structure, one end thereof being adjacent said photocathode, said dynode adapted to be maintained at the same potential as said photocathode, an elongated accelerating electrode above said photocathode and dynode and adapted to be maintained at an elevated potential with respect to said dynode and photocathode for attracting electrons emitted thereby, means for providing a magnetic field about said photocathode and dynode to urge electrons emitted thereby along said dynode in a direction parallel to the direction of elongation of said dynode, and a collector for receiving electrons from an end of said dynode remote from said photocathode,

the improvement comprising shield means for preventing electrons thermionically emitted by cathode support structure adjacent said photocathode from reaching said dynode so as to prevent amplification of said thermionic electrons said shield means comprising a conductive shield spaced between said support structure and said accelerating electrode.

3,914,600

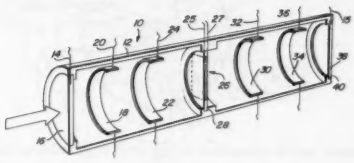
ELECTRON IMAGE INTEGRATION INTENSIFIER TUBE

Charles M. Redman, Las Cruces, N. Mex., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 25, 1974, Ser. No. 491,910

Int. Cl.² H01J *31/50*

U.S. Cl. 250—213 VT **1 Claim**



1. An image integrating intensifier tube comprising:

means for converting an input image to an electron image;

a plurality of adjacently situated semiconductor N caps and semiconductor P components, forming P-N junctions, disposed in a first plain aligned with the converting means, for producing electron-hole pairs at a gain in response to the impingement of an electron image against the N caps;

a second plurality of adjacently situated semiconductor P caps and semiconductor N components forming P-N junctions, disposed in a second plane spaced from the first;

a plurality of conductor fiber means, each one of which is mounted in contact with respective P and N caps;

a plurality of insulator means mounted in contact with respective P and N components, the insulator means and conductor fiber means positioned in side-by-side abutment, in between the first and second planes;

a first conductor grid mounted in outward juxtaposition with the first plane and having conducting portions thereof contacting the P components;

a second conductor grid mounted in outward juxtaposition with the second plane and having conducting portions thereof contacting the N components;

means connected to the first and second conductor grids for impressing a voltage thereacross resulting in the integration and storage of electrical charges in the P-N junction during a first state thereof;

the voltage impressing means further impressing a second voltage across the conductor grids during a second state thereof, resulting in transferral of electrons from the second conductor grid, in an image intensified with respect to the impinging electron image; and

means positioned in a path receiving the transferred electron image for producing an intensified output image.

3,914,601

COMPACT VIEWING ASSEMBLY FOR LIGHT SENSITIVE SORTING MACHINE

Michael C. Hoover, and William C. Long, both of Houston, Tex., assignors to Petty-Ray Geophysical, Inc., Houston, Tex.

Filed Mar. 29, 1974, Ser. No. 456,256

Int. Cl.² H01J *5/16*

U.S. Cl. 250—226 **12 Claims**

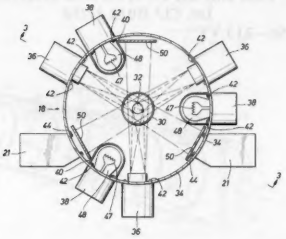
1. In a light-sensitive sorting machine for sorting a succession of articles freely falling along a predetermined path, a compact viewing assembly comprising:

a transparent tube through which articles to be sorted may fall along said path;

a housing surrounding a portion of said tube to define an enclosed viewing chamber;

a plurality of background members disposed at spaced locations in said housing, each of said background members being equidistant from said path;

a plurality of optical viewing means disposed in a plane normal to said path to view articles falling along said path against respective of said background members;



a plurality of lamp means disposed in said plane to illuminate said articles and said background members, each of said lamp means being equidistant from said path; and

shield means disposed proximate each of said lamp means to prevent direct illumination of said optical viewing means by said lamp means.

3,914,602

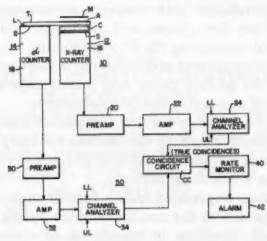
PLUTONIUM MONITOR

Norman P. Goldstein, Delmont, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 14, 1973, Ser. No. 415,603

Int. Cl. G01t *1/20*

U.S. Cl. 250—253 **3 Claims**



1. Apparatus for distinguishing alpha emitting plutonium isotopes from radon and its daughter products in a predetermined environment, comprising, first means including a photomultiplier tube and an X-ray scintillation crystal operatively coupled to the viewing surface of said photomultiplier tube to monitor the X-ray emissions in said predetermined environment, second means including a photomultiplier tube and, an alpha scintillation means positioned in a spaced apart relationship with said X-ray scintillation crystal so as to view said predetermined environment, light conducting means extending from between said X-ray scintillation crystal and said alpha scintillation means to the viewing surface of said photomultiplier tube of said second means, said photomultiplier tube of said first means generating an output signal representative of the X-ray scintillations occurring in said X-ray scintillation crystal and the photomultiplier tube of said second means generating an output signal representative of the alpha scintillations occurring in said alpha scintillation means.

3,914,603

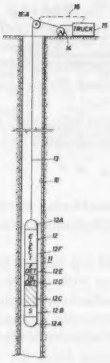
NEUTRON LIFETIME WELL LOGGING METHODS AND APPARATUS

Hans J. Paap, and Robert W. Pitts, Jr., both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 17, 1973, Ser. No. 425,367

Int. Cl. G01v *5/00*

U.S. Cl. 250—270 **32 Claims**



1. A method for determining parameters of interest in a borehole traversing earth formations by means of thermal neutron characteristics generated in a borehole and comprising the steps of

continuously generating high energy neutrons in a well bore and bombarding the surrounding media with such neutrons,

modulating the intensity of said high energy neutrons harmonically as a function of time for developing an intensity modulated cloud of thermal neutrons as a function of time in said surrounding media, and

measuring a thermal neutron characteristic of said intensity modulated cloud of thermal neutrons for determining a parameter of interest relative to said surrounding media.

3,914,604

MEASUREMENT OF ABSORPTION OF RADIATION

Michael Robert Hornby, Stockton-on-Tees, and David Frank Tunstall, Redcar, both of England, assignors to British Titan Limited, Billingham, Teaside, England

Filed Apr. 20, 1973, Ser. No. 353,198

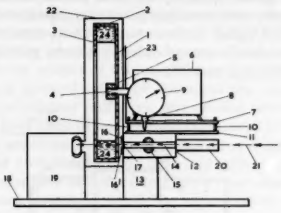
Claims priority, application United Kingdom, May 20, 1972, 23850/72; May 20, 1972, 23849/72

Int. Cl. G01T *1/16*

U.S. Cl. 250—272 **26 Claims**

1. A method of measuring the absorption or scattering effect of particles precipitating in a liquid rotating in a centrifuge on a beam of electromagnetic radiation comprising passing a beam of electromagnetic radiation of wave length up to 1000A through a liquid containing dispersed particles retained within an annular chamber at the periphery of a disc-like member during rotation of the disc-like member, substantially at right angles to the plane of said disc-like member, said beam having a thickness *d* in a radial direction where *d/r* is not greater than 0.2 and in which *r* is the radial depth of the beam in the liquid from the radial inner surface thereof and where

r/R is not greater than 0.1 where R is the radius from the centre of the disc-like member to the radial inner surface of



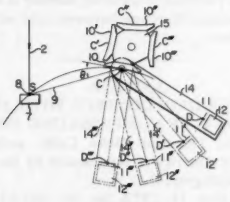
the liquid and measuring the amount of absorption or scattering of the radiation as the particles settle during rotation.

3,914,605

X-RAY SPECTROSCOPE

Kouichi Hara, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed May 28, 1974, Ser. No. 473,898
Claims priority, application Japan, May 30, 1973, 48-59787
Int. Cl. G01t *1/00*
U.S. Cl. 250—276 **6 Claims**



1. An X-ray spectrometer comprising,
an X-ray source;
a plurality of curved crystals for diffracting an X-ray beam emitted from said X-ray source, said curved crystals having radius of curvature different from each other, one of said curved crystals being disposed at a diffracting position where said X-ray beam is diffracted;
a slit means for taking out said diffracted X-ray beam;
a vacuum chamber for arranging therein said X-ray source, said curved crystals and said slit means which are situated on a Rowland's circle;
a first rotating means for rotating said slit means by means of a first rotary shaft, said first rotary shaft having an axis of rotation passing through the center of the curved surface of said curved crystal disposed at said diffracting position, and
a second rotating means including a second rotary shaft for rotating one of said curved crystals onto said diffracting position in accordance with the rotation of said slit means.

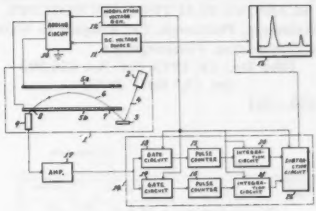
3,914,606

ELECTRON DETECTOR

Hiroshi Hashimoto, and Akinori Mogami, both of Akishima, Japan, assignors to Nihon Denshi Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1974, Ser. No. 448,480
Claims priority, application Japan, Mar. 12, 1973, 48-28724
Int. Cl.² H01J *39/00*
U.S. Cl. 250—305 **8 Claims**

1. A device for detecting signals indicative of the density of electrons of given energy level absent background noise in an electron beam having high background noise for all energy levels comprising:
a. analyzing means for discretely passing electrons of the given energy level and at least one different adjacent energy level,
b. detecting and integrating means associated with said analyzer for detecting the electrons passed by said analyzer and producing a first signal indicative of the density of electrons of the given energy level and at least one second signal indicative of the density of the electrons of at least one different adjacent energy level,
c. processing means for subtracting a function of the at least one second signal from the first signal to provide a signal indicative of the density of electrons of the given energy level absent background noise.

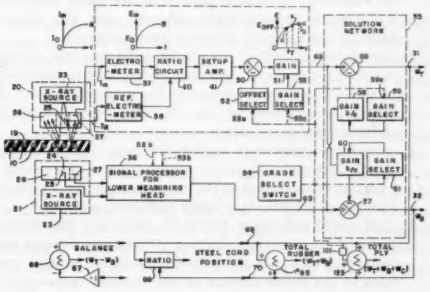


3,914,607

THICKNESS MEASURING APPARATUS AND METHOD FOR TIRE PLY AND SIMILAR MATERIALS

Boong Youn Cho, and Orval L. Utt, both of Columbus, Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio

Filed Dec. 12, 1973, Ser. No. 423,921
Int. Cl. G01t *1/16*
U.S. Cl. 250—308 **26 Claims**



1. A method for measuring the thicknesses of a first material applied to opposite sides of reinforcing cords of a second material, the material of the reinforcing cords having a high effective atomic number relative to the atomic number of the material applied to the opposite sides of the reinforcing cords, comprising the steps of directing X-ray radiations to both sides of the ply, said X-ray radiations and the ply producing backscattered radiation on each side of the ply that is a function of the thickness of the first material on both sides of the ply, sensing the backscattered radiation on each side of the ply and obtaining first and second signals, the first signal being obtained from one side of the ply and the second signal being obtained from the other side of the ply, both of said signals being functionally related to the thicknesses of the first material on both sides of the ply, combining the first and second signals to obtain a third signal that is representative of the thickness of rubber on one side of the cords and substantially independent of changes in the thickness of rubber on the

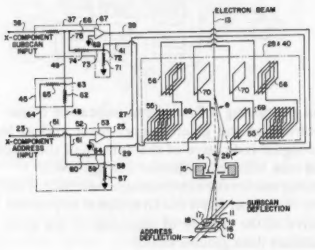
opposite side of cords, and combining the first and second signals to obtain a fourth signal, said fourth signal being representative of the thickness of rubber on the opposite side of the cords and substantially independent of changes in the thickness of rubber on said one side of the cords.

3,914,608

RAPID EXPOSURE OF MICROPATTERNS WITH A SCANNING ELECTRON MICROSCOPE

Paul R. Malmberg, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 19, 1973, Ser. No. 426,393
Int. Cl.² H01J 29/00
U.S. Cl. 250—311 **4 Claims**



1. Apparatus for rapid exposure of a precision micropattern on a major surface of a prepared member with a scanning electron microscope comprising:

A. a prepared member having a major surface;

B. a scanning electron microscope positioned to project a small cross-sectional electron beam onto the major surface of the member;

C. an address generator means for generating electrical signals corresponding to successive coordinate addresses for exposing a precision pattern at the major surface of the member in successive subscans with the electron beam of the scanning electron microscope;

D. low speed deflection means for deflecting the electron beam of the scanning electron microscope to successive coordinate address positions at the major surface of the member responsive to the electrical signals from the address generator means;

E. a subscan generator means for generating electrical signals corresponding to successive subscans for exposing a precision subpattern at the major surface of the member about said coordinate address positions; and

F. high speed deflection means for deflecting the electron beam of the scanning electron microscope through subpatterns about said successive coordinate address positions at the major surface of the member responsive to the electrical signals from the subscan generator means.

3,914,609

SIGNAL AMPLIFICATION BY ILLUMINATION OF A PARTIALLY DEVELOPED LATENT ELECTROSTATIC IMAGE

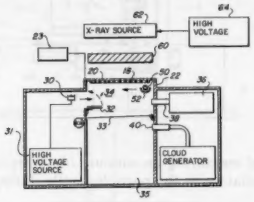
Lothar S. Jeromin, Sierra Madre, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 4, 1974, Ser. No. 448,128
Int. Cl.² G03G 13/00
U.S. Cl. 250—315 A **13 Claims**

1. A method of increasing the potential difference between two adjacent developed charge patterns of differing charge density formed on a photoconductive surface comprising the steps of:

a. providing a photoconductive surface having at least two adjacent initial charge patterns of differing charge density thereon, said charge patterns being of a first polarity, said photoconductive surface being sensitive to light of a predetermined wavelength,

b. initially depositing a developer powder which is charged to a second polarity on said photoconductive surface whereby said developer powder is deposited denser in the areas of higher surface charge density than in the areas of lower surface charge density, thereby providing a developed charge pattern,



c. uniformly exposing the developed charge pattern of light of said predetermined wavelength, the initially deposited developer powder forming a mask which absorbs light in proportion to the density of the deposited developer powder, and

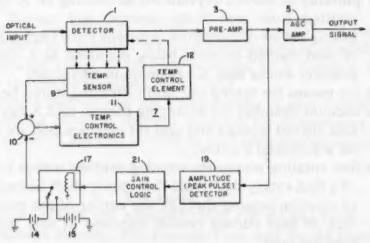
d. thereafter applying additional developer powder charged to said second polarity to said developed charge pattern whereby the potential difference between adjacent developed charge patterns of differing density is at least equal to the potential difference between said adjacent initial charge patterns.

3,914,610

IR-DETECTOR GAIN CONTROL WITH AMBIENT TEMPERATURE COMPENSATING MEANS

Claude R. Bigbie, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 21, 1972, Ser. No. 308,631
Int. Cl.² G01J 1/00
U.S. Cl. 250—338 **1 Claim**



1. A control circuit comprising a temperature sensitive detector having an input and an output; an amplifier having an input and an output; the output of said detector being connected to the input of said amplifier; temperature controlling means connected to said detector for controlling the ambient temperature thereof; sensing means having an input connected to the output of said amplifier and an output connected to control said temperature controlling means; said temperature controlling means maintaining the ambient temperature of the detector at a first predetermined ambient temperature until receipt of a signal from the output of the sensing means, at which time the temperature controlling means will cause the ambient temperature of the detector to change; said sensing means producing an output only when the output of the amplifier reaches a predetermined value; said detector is an optical detector having optical radiation fed to its input; said temperature controlling means having therein a switching

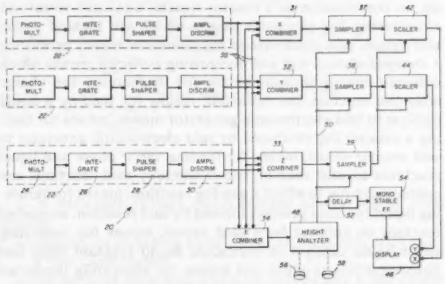
means which, when in one condition, will cause the temperature controlling means to control the detector at said first predetermined ambient temperature and, when in the second position, will cause the temperature controlling means to control the temperature to a different ambient temperature; said switching means having a control input; said sensing means comprising an amplitude detector having an input connected to the output of the amplifier and an output connected to said control input of the switching means; said optical input is infrared radiation; said sensing means further comprising a gain control logic circuit connected between the output of the amplitude detector and the input of said control means of said switching means; and said gain control logic circuit preventing the output of amplitude from reaching said switching means until the detector has an amplitude output for a predetermined minimum amount of time.

3,914,611

GAMMA CAMERA

Karl J. Stout, Hudson, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Nov. 21, 1973, Ser. No. 418,157
Int. Cl. G01t 1/20
U.S. Cl. 250—369 **7 Claims**



1. A camera system comprising:

an array of detectors of radiant energy positioned in a predetermined pattern for receiving such energy, each of said detectors providing a signal upon being illuminated with such energy;

means coupled to each of said detectors for integrating successive ones of said detector signals;

means coupled to said integrating means for delaying a signal of said integrating means;

means coupled to said delay means and to said integrating means for forming the difference between a signal of said delay means and a signal of said integrating means, the delay of said delay means being of shorter duration than an integration time of said integrating means, said differencing means providing a pulse signal having an amplitude proportional to a signal of said integrating means; and

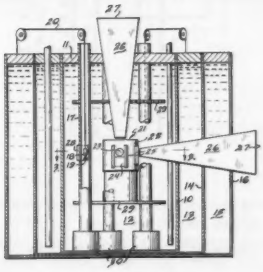
means coupled to said differencing means for combining signals of said differencing means corresponding to individual ones of said detectors, said combining means including means for weighting signals of said differencing means in accordance with the positions of individual ones of said detectors in said array to provide the coordinate positions of points in an image, said weighting providing a scaling of individual ones of said detector signals inversely to the spacings between each of said detectors and a coordinate axis of said array.

3,914,612

NEUTRON SOURCE

John L. Cason, Jr., Birmingham, Ala., and Carl B. Shaw, Richland, Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 26, 1974, Ser. No. 500,790
Int. Cl.[2] G21G 4/02
U.S. Cl. 250—499 **10 Claims**



1. A neutron source comprising a vessel containing a moderating media, a flux trap containing a moderating media of high moderating ratio at the center of said vessel, the moderating ratio of the first mentioned moderating media being lower than that of the moderating media in the flux trap, a shell of depleted uranium dioxide surrounding the moderating media in the flux trap, a plurality of guide tubes in said vessel distributed uniformly around the flux trap and equidistant therefrom, a source of neutrons within each of said guide tubes, a neutron shield surrounding a portion of each of said guide tubes, means for moving said sources of neutrons from a position adjacent the flux trap to a position within the neutron shield, and collimator means defining at least one neutron beam path from the flux trap to the exterior of the neutron source.

3,914,613

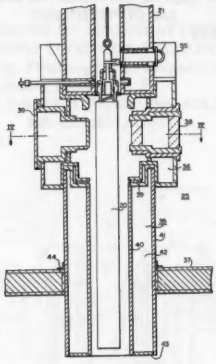
INSPECTION AND REPAIR APPARATUS FOR A NUCLEAR REACTOR FUEL ASSEMBLY

John M. Shallenberger, Pittsburgh; Leonard P. Hornak, Irwin, and Walter E. Desmarchais, Monroeville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 6, 1974, Ser. No. 440,104
Int. Cl. G21f 7/02
U.S. Cl. 250—515 **8 Claims**

1. Apparatus for inspecting and repairing an elongated radioactive fuel assembly comprising tubular shielding means for shielding said fuel assembly, said fuel assembly being positioned within said shielding means during said inspecting and repairing operations, viewing means for inspecting all sides of said fuel assembly, said viewing means being rotatably

mounted on said shielding means, and access means for exposing all sides of said fuel assembly, to permit repairs thereof



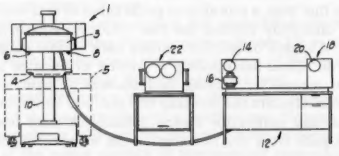
said access means being mounted rotatably on said shielding means.

3,914,614

APPARATUS AND METHOD FOR FACILITATING ALIGNMENT OF A COLLIMATOR

Ronald J. Martone, Cheshire; Samuel C. Goldman, Bethany, and Roy Dewhirst, Cheshire, all of Conn., assignors to Picker Corporation, Cleveland, Ohio

Filed June 10, 1974, Ser. No. 477,823
Int. Cl.² G21C *11/00*
U.S. Cl. 250—515 **39 Claims**



1. Alignment apparatus in a radiation imaging system for aligning first and second mating members comprising:

a. alignment plunger means including a plunger rod extending along the axis of alignment in association with the first member and means for retractably urging the rod into an extended position;

b. protruding means associated with said first member and with said rod said protruding means extending in the direction of alignment; and,

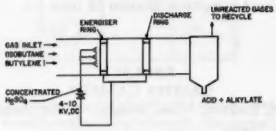
c. said second member having means associated therewith, including a recess, positioned and configured to recieve said rod, said recess having an upper side boundary tapered from the surface of the second member to an inward perimeter, and a lower side boundary extending substantially untapered from said inward perimeter for receiving said protruding means.

3,914,615

APPARATUS FOR GAS-FOG REACTION PROCESSES

Jaydee W. Miller, Wallingford, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 150,607, June 7, 1971, Pat. No. 3,717,686, and a continuation-in-part of Ser. No. 250,718, May 5, 1972, Pat. No. 3,780,130. This application Apr. 26, 1973, Ser. No. 354,559
Int. Cl.² B01K *1/00*; C07C *3/54*
U.S. Cl. 250—531 **5 Claims**



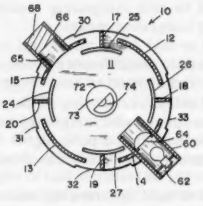
1. Apparatus, useful in gas-fog reaction processes, comprising, in combination as a reactor system, a reactor vessel and electrostatic fog generator means which are located within said vessel, said electrostatic fog generator means producing a charged aerosol fog and comprising collector means which collector means include means for discharging the charge after the reaction has occurred, means for feeding a liquid catalyst to said electrostatic generator means, means for feeding a catalyst fog produced by said electrostatic generator to said reactor vessel, means for feeding vapor phase and liquid reactants to said reactor vessel whereby said reactants can contact said fog to effect a gas-fog reaction, means for removing liquid reaction product formed by said reaction, unreacted reactant or catalyst from said vessel, means for separating spent liquid catalyst or unreacted liquid reactant from said liquid reaction product and means for separating unreacted vapor phase reactant from said liquid reaction product.

3,914,616

SMOKE DETECTOR

Joseph Moolbroek, 8673 Hillside Trail, Cottage Grove, Minn. 55016

Filed Aug. 5, 1974, Ser. No. 494,451
Int. Cl.² G08B *17/10*
U.S. Cl. 250—574 **10 Claims**



1. A smoke detector comprising in combination:

a detection chamber comprising a first outer generally cylindrical foraminous wall, a second generally cylindrical foraminous wall inside said first wall, a third inner generally cylindrical foraminous wall inside said second wall, the openings in said walls staggered relative to each other, and radial walls extending between said first and third walls in the openings in said second wall said walls

preventing the existance of any straight optical paths from outside the detection chamber to inside the chamber and further including first and second end closures to prevent the entry of spurious radiation;

a radiation source operable to direct light into said chamber;

a radiation detector positioned out of the path of radiation from said source but in position to receive any radiation from said source which reflects from smoke particles in said chamber; and

means connected to said detector to sense the reception of radiation thereby and trigger a suitable alarm.

3,914,617

VERY HIGH VOLTAGE POWER SUPPLY GENERATING A RECURRENT STEPPED VOLTAGE

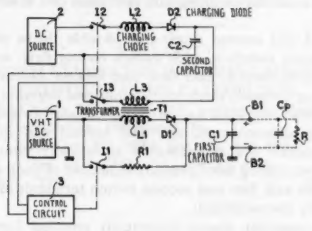
Ange Corbel, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Nov. 26, 1973, Ser. No. 418,806

Claims priority, application France, Nov. 28, 1972, 72.42259

Int. Cl.² G05F 1/46

U.S. Cl. 307—56 **10 Claims**



1. A very-high-voltage direct-current power supply comprising:

a load circuit including a pair of output terminals bridged by a first capacitance;

a first network including a first DC source and a first charging circuit for said first capacitance connecting said source across said output terminals, said first charging circuit including a first winding;

a second network including a second DC source, a second capacitance and a second charging circuit connecting said second source across said second capacitance;

a first discharge circuit for said first capacitance shunting said first charging circuit;

first switch means in series with said first discharge circuit; second switch means in series with said second charging circuit;

a second discharge circuit for said second capacitance including a second winding inductively coupled with said first winding;

third switch means in series with said second discharge circuit; and

control means for said first, second and third switch means producing a recurrent stepped output voltage of period T, with a basic level and several elevated levels, by closing said first discharge circuit during an initial phase of each period T to establish said basic voltage level equal to the voltage of said first source, repeatedly closing said second charging circuit within each period T to deliver a succession of charge increments to said second capacitance during consecutive intervals, briefly closing said second discharge circuit after each of said intervals to transfer said charge increments to said first capacitance via said first and second windings for establishing said elevated levels, and holding said first and second discharge circuits open for a final interval at the end of said period T.

3,914,618

TWO-PHOTON PUMPED FREQUENCY CONVERTER AND METHOD

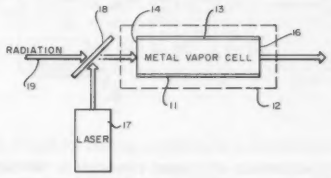
Stephen E. Harris, 880 Richardson Court, Palo Alto, Calif. 94306

Filed Jan. 28, 1974, Ser. No. 437,195

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H02M 5/04; H03F 7/00

U.S. Cl. 307—88.3 **19 Claims**



1. A frequency converter for converting low frequency input energy to higher frequency output energy comprising means containing a metal vapor at predetermined pressure, a high energy pump source projecting energy into said metal vapor to excite the metal atoms, said energy being selected such that the sum of two photons equals the spacing of a non-allowed transition in said metal vapor, said means containing the metal vapor disposed to receive said low frequency energy whereby said energy couples the excited metal atoms to allow transition to ground to provide an output having a frequency equal to the sum of the two photons plus or minus the low frequency input energy.

16. An image converter for converting infra-red input energy from an object to energy at the visible or ultra-violet region of the spectrum comprising means containing a metal vapor at predetermined pressure, a high energy pump source projecting energy into said metal vapor to excite the metal atoms, said energy being selected such that the sum of two photons equals the spacing of a non-allowed transition in said metal vapor, said means containing the metal vapors disposed to receive said infra-red energy whereby said energy couples the excited metal atoms to an allowed transition to ground to provide an output having a frequency equal to the sum of the frequency of the two photons plus or minus the frequency of the infra-red energy.

3,914,619

FREQUENCY RESPONSIVE SWITCHING CIRCUIT

Dennis D. Talmage, Plymouth, and Paul D. Stokes, Westland, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 8, 1975, Ser. No. 539,571

Int. Cl.² H01H 35/06

U.S. Cl. 307—129 **10 Claims**

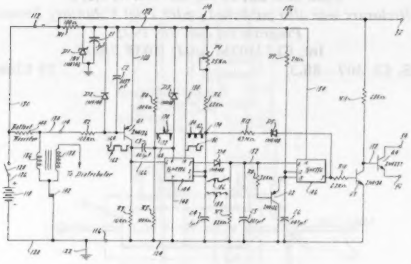
1. A frequency responsive switching circuit, which comprises, in combination:

an integrated circuit dual timer comprising first and second retriggerable monostable multivibrators;

circuit means coupling the output of said first multivibrator to the input of said second multivibrator;

timing circuits for each of said multivibrators, the timing circuit for said first multivibrator being set to produce an output pulse duration less than the output pulse duration set by the timing circuit for said second multivibrator; and

circuit means for modifying the timing characteristic of said timing circuit for said first multivibrator in response



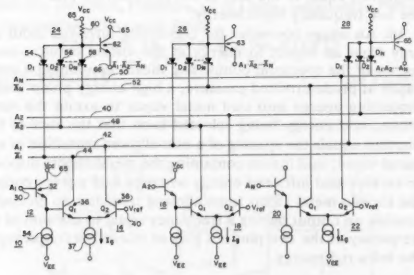
to the occurrence of a signal condition at the output of said second multivibrator.

3,914,620

DECODE CIRCUITRY FOR BIPOLAR RANDOM ACCESS MEMORY

Michael S. Millhollan, Mesa, and Ronald L. Treadway, Scottsdale, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

Filed Dec. 26, 1973, Ser. No. 428,511
Int. Cl.² H03K *19/36, 19/22;* **G11C** *8/00*
U.S. Cl. 307—215 **6 Claims**



1. A high speed logic gate comprising:

a plurality of emitter-coupled inverters, each including first and second transistors having their emitters coupled together, said first transistor having its base coupled to a node adapted to have applied thereto a signal representative of an input logic signal, said second transistor having its base coupled to a reference voltage conductor, a current source connected to said emitters;

a plurality of diodes having anodes thereof coupled together to resistive load means coupled between said anodes and a first voltage conductor;

a collector electrode of one of said first and second transistors of each of said emitter coupled inverters being coupled respectively, to the cathode of one of said diodes;

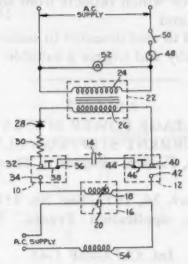
and output circuit means coupled to the anodes of said plurality of diodes.

3,914,621

CIRCUIT FOR ENABLING SAFE ACTUATION OF A MACHINE

Henry Andrew Passarelli, Jr., Coventry, R.I., assignor to General Electric Company, New York, N.Y.

Filed Oct. 7, 1974, Ser. No. 512,499
Int. Cl.² H01H *19/00*
U.S. Cl. 307—113 **2 Claims**



1. A circuit for enabling safe operation of a machine, comprising:

a. first and second single pole double throw momentary contact switches, each switch having first, second and third terminals, said first and second switch terminals being normally electrically connected together when said second and third switch terminals are normally electrically disconnected, and said second and third switch terminals are momentarily electrically connected together during hand pressure actuation of each said switch when said first and second switch terminals are momentarily disconnected;

b. a capacitor always electrically coupled between said second terminals of said first and second switches;

c. means electrically connected between said first terminals of said first and second switches for charging said capacitor when said first and second terminals of said respective first and second switches are electrically connected together; and

d. a relay having a coil and a normally open relay contact, said coil being electrically connected between said third terminals of said first and second switches for providing a discharge path for said capacitor only when said second and third terminals of said respective first and second switches are momentarily electrically connected together, said normally open relay contact being in circuit relationship with the machine, whereby upon discharge of said capacitor through said coil, said normally open relay contact closes and enables operation of the machine, and upon return of both of said first and second switches to their respective normal unactuated positions, said charging means recharges said capacitor to await enabling of the next operation of the machine.

3,914,622

LATCH CIRCUIT WITH NOISE SUPPRESSION

Donald E. Pezzolo, Cupertino, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

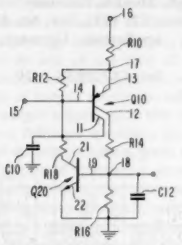
Filed Feb. 8, 1974, Ser. No. 440,929
Int. Cl.² H03K *3/26*
U.S. Cl. 307—288 **8 Claims**

1. Circuits which comprises:

a. a first transistor of a first conductivity type having at least two collector regions, a base region, and an emitter region coupled to a voltage source;

b. a second transistor of a conductivity type opposite from that of said first transistor having a base region, an emitter region coupled to a reference potential, and a collector region coupled to said base region of said first transistor;

c. a resistive means coupling said base region of said second transistor to a first of said at least two collector regions;



d. capacitive means coupling said base region of said second transistor to said reference potential, said resistive means and said capacitive means co-act to suppress the amplitude of voltage transients; and,

e. means coupling a second one of said at least two collector regions to said base region of said transistor.

3,914,623

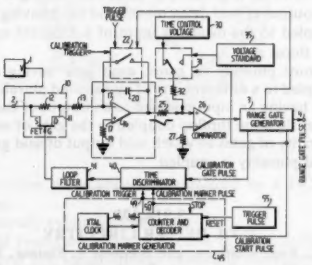
WAVEFORM GENERATOR INCLUDING MEANS FOR AUTOMATIC SLOPE CALIBRATION

Steven John Clancy, Linthicum, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 31, 1973, Ser. No. 411,495

Int. Cl.² G06G 7/12; H03K 4/10

U.S. Cl. 307—229 **25 Claims**



1. In a waveform generator including an integrator for providing an output voltage which is a function of time, the improvement comprising: a feedback-responsive variable resistance device connected to provide an input signal to said integrator, comparator means coupled to the output of said integrator for providing an output signal in response to the output signal level of said integrator attaining a predetermined level, a voltage standard coupled to said comparator means to determine the time when the output of said integrator reaches the predetermined level, time comparison means coupled to said comparator means for comparing the time span for the output of said integrator to reach the predetermined voltage level to a preselected time span and for providing a time error output indicative of the difference therebetween, and means coupling the error output in a closed loop to a control terminal of said feedback-responsive variable resistance means, whereby said feedback-responsive variable resistance means varies the input voltage to said integrator, said time error output is nulled, and waveform slope is automatically controlled.

3,914,624

CIRCUIT TO RAISE A QUANTITY TO A PREDETERMINED POWER

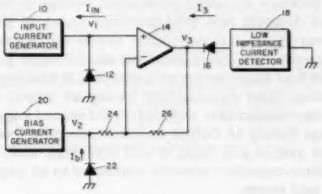
Harold W. Jackson, Baltimore, Md., assignor to The Bendix Corporation, Southfield, Mich.

Filed Dec. 26, 1973, Ser. No. 428,177

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03K 17/00

U.S. Cl. 307—229 **8 Claims**



1. A circuit for raising a quantity to a predetermined power comprising:

an operational amplifier having first and second high impedance input terminals and an output terminal:

a first constant voltage terminal;

first diode means for connecting said first terminal to said first constant voltage terminal;

first resistor means for connecting said second terminal to said output terminal;

a bias current terminal;

second resistor means for connecting said second terminal to said bias current terminal;

a second constant voltage terminal;

second diode means for connecting said bias current terminal to said second constant voltage terminal;

a third constant voltage terminal;

third diode means for connecting said operational amplifier output terminal to said third constant voltage terminal;

means for injecting a bias current at said bias current terminal, said bias current thereby flowing in said third diode means;

means for injecting an input current at said first input terminal, said input current being related to said quantity to be raised to a predetermined power, and the resultant current through said third diode means being thereby related to the quantity as raised to said predetermined power.

3,914,625

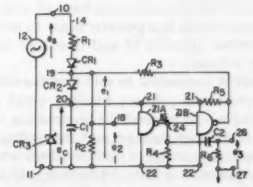
ZERO CROSSOVER CIRCUIT

William W. Billings, and Lynn L. Tipton, both of Lima, Ohio, assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 13, 1973, Ser. No. 387,992

Int. Cl. H03k 3/00

U.S. Cl. 307—235 R **3 Claims**



1. A circuit for producing an output pulse at a zero crossover point of a supplied AC voltage waveform and requiring

no power to be supplied apart from the supplied AC voltage, comprising:

half wave rectifier means including a pair of like poled serially connected diode rectifiers;

a capacitor serially connected with said half wave rectifier means and comprising with said rectifier means a circuit branch having a pair of terminals for connection across an AC voltage supply;

a voltage reference diode connected across said capacitor;

a voltage level detector having an input connected to be responsive to the charge condition of said capacitor and to produce an output pulse when voltage to the input of said detector is a predetermined value of the voltage occurring at the same time across said capacitor said detector comprising first and second logic gate stages, said first stage having an input that is said input of said voltage level detector and having an output that is directly connected to an input of said second stage, and said stage having an output coupled through a feedback circuit path to said input of said first stage; and,

a resistor-capacitor network connected to an output of one of said stages.

3,914,626
SAMPLING CIRCUIT

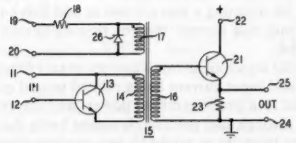
William Anders Peterson, Lake Parsippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 21, 1973, Ser. No. 389,639

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03K *17/00*

U.S. Cl. 307—235 B **8 Claims**



1. A sampling circuit having a transistor which in response to being gated into conduction produces at a pair of output terminals a sample of an input voltage appearing at a pair of input terminals, said circuit characterized in that:

a transformer having a primary winding and a secondary winding has its primary winding directly connected between the collector and emitter of said transistor;

said transformer remaining in a nonsaturating mode over its intended operating range;

means connect the collector and base of said transistor to said input terminals in a polarity sense to reverse-bias the base-to-emitter junction of said transistor in response to said input voltage;

a pulse source is connected to said transformer to induce a voltage across said primary winding which if not otherwise limited would exceed the summation of the amplitudes of said input voltage and the voltage across the base-to-emitter junction of said transistor when said base-to-emitter junction is forward-biased, said induced voltage being in a polarity sense to forward-bias said transistor; and

means connect said secondary winding between said output terminals.

3,914,627
STORAGE DEVICE WITH SEVERAL BISTABLE FLIPFLOPS

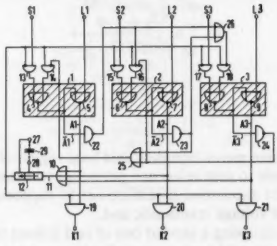
Werner Meier, Bubenreuth, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 27, 1973, Ser. No. 428,777

Claims priority, application Germany, Dec. 29, 1972, 2264135

Int. Cl.² H03K *3/29*

U.S. Cl. 307—238 **5 Claims**



1. A storage device comprising:

a. a plurality of bistable flip flops each having a set input, clear input and disabling input;

b. a common bus to which an output from each flipflop is coupled, said bus including therein delay means;

c. a first plurality of gates equal in number to said plurality of flip flops with a respective output of each of said first plurality of gates coupled to the set input of a different one of said flip flops, each gate having as one input the output of said delay means and each having a second input coupled to respective setting terminals;

d. a second equal plurality of gates each having as one input the output of said delay means and each having its output coupled to the disabling input of a different one of said flip flops; and

e. a third plurality of gates, each gate having an output coupled to a different one of said second plurality of gates and having an input coupled to an output of each flipflop other than the flipflop coupled to the gate of said second plurality of gates to which said output of said gate of said third plurality is coupled.

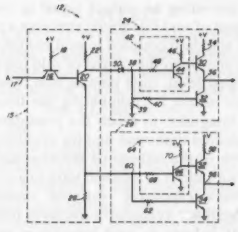
3,914,628
T-T-L DRIVER CIRCUITRY

Henry C. Pao, Waltham, and Stephen A. Steiner, Lexington, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 301,682, Oct. 27, 1972, abandoned. This application May 13, 1974, Ser. No. 469,174

Int. Cl.² H03K *1/00, 3/26*

U.S. Cl. 307—270 **2 Claims**



1. Driver circuitry comprising:

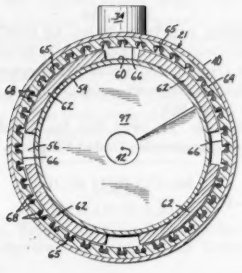
a. phase splitter means for developing complementary signals at a pair of output terminals, such means including:
i. a coupling transistor, the emitter electrode thereof for connection to a binary signal source; and,
ii. an emitter follower transistor having:
a. base electrode connected to the collector electrode of such coupling transistor; an emitter electrode connected to one of the pair of output terminals, and, a collector electrode connected to the other one of the pair of output terminals; and,
b. a pair of output stages, each one thereof coupled to said emitter follower transistor at a different one of the pair of output terminals, each one of such stages including a pair of transistors arranged in an active pull-up configuration, the base electrode of one of the pair of transistors in each one of the stages being connected to a different one of such pair of output terminals through only passive elements.

3,914,629

CENTERLESS BRUSHLESS DC MOTOR

William P. Gardiner, 3621 Highland, White Bear Lake, Minn. 55110

Filed Dec. 13, 1974, Ser. No. 532,617
Int. Cl.² H02K *37/00*
U.S. Cl. 310—46 **18 Claims**



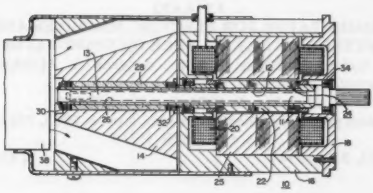
1. A gearless drive apparatus powered by a DC source, comprising:
a. a generally cylindrical housing;
b. a rigid centerless cylindrical drive tube, rotatable about a central axis longitudinally extending therethrough;
c. bearing means in said housing operatively engaging said drive tube at opposite ends thereof for supportingly mounting said tube to said housing for rotation about said central axis, wherein the internal surface of said drive tube as mounted defines a cylindrical passageway through said housing;
d. a plurality of permanent magnets circumferentially mounted to the outer surface of said drive tube for rotation therewith;
e. electrical winding means fixedly mounted in said housing for creating when energized a plurality of induced magnetic fields spaced from and circumferencially disposed around said drive tube and in cooperative alignment with said permanent magnets; and
f. energizing means operatively responsive to said rotational movement of said drive tube for selectively and sequentially energizing said winding means from said DC source to create said plurality of induced magnetic fields having predetermined polarities, which induced magnetic fields cooperate with the magnetic fields of said permanent magnets to exert a rotational torque about said central axis upon said drive tube.

3,914,630

HEAT REMOVAL APPARATUS FOR DYNAMOELECTRIC MACHINES

Wayne B. Lloyd, Baltimore; Dale R. Logan, Arnold, both of Md., and Yu-Sun Tang, Bethel Park, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 23, 1973, Ser. No. 408,974
Int. Cl. H02k *1/32*
U.S. Cl. 310—61 **8 Claims**



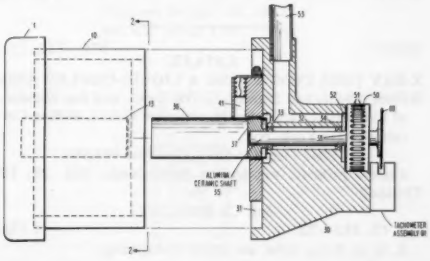
1. Apparatus for removing heat from a dynamoelectric machine comprising a housing, a stator and a rotor; said apparatus for removing heat comprising an elongated heat conductable hollow shaft having a wick therein, said shaft having an evaporator end and a condenser end, said rotor being fixedly attached to said evaporator end of said shaft, a finned heat remover rotatably disposed about the condenser end of said shaft, said rotor conducting heat to said fixedly attached hollow shaft, said hollow shaft having a fluid therein that condenses at the finned heat remover end, said condensed fluid passing through said wick member in said hollow shaft to the evaporative end where said fluid evaporates within said shaft, said fluid receiving heat from said rotor and passing as a gas through the center of said shaft to the condenser end to renew the condensation evaporation cycle, said finned heat remover rotating about said hollow shaft in a heat transfer relationship, said finned heat remover being rotated by a power source separate from the dynamoelectric machine.

3,914,631

CAPSTAN MOTOR HAVING A CERAMIC OUTPUT SHAFT AND AN ADHESIVELY ATTACHED CAPSTAN

Adolfo M. Guzman, Boulder, Colo., and Harlan D. Lawes, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 17, 1973, Ser. No. 389,295
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl. H02K *7/10*
U.S. Cl. 310—75 **8 Claims**



1. A high torque — low inertia tape drive capstan motor, comprising:
a stationary magnetic field structure providing an air gap,
a rotatable armature positioned to rotate within said air gap,
a ceramic shaft connected to be driven by said armature by having one end thereof attached to the center of rotation of said armature, and

a tape drive capstan adhesively attached to the other end of said shaft in close physical proximity to said armature and said magnetic field structure, the heat insulation and magnetic reluctance properties of said shaft functioning to isolate said capstan and its adhesive interface from temperature rise and magnetic field induced by motor operation.

3,914,632

COMMUTATOR FOR ELECTRIC MACHINES AND METHOD OF MAKING SUCH A COMMUTATOR

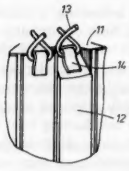
Olle Nyllen, Huddinge, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Apr. 5, 1974, Ser. No. 458,340

Claims priority, application Sweden, Apr. 6, 1973, 7304875

Int. Cl.² H02K *39/16*

U.S. Cl. 310—234 **2 Claims**



1. A commutator for an electrically operated device comprising an electrically non-conductive cylindrically shaped body provided with a substantially centrally located thorough hole, a plurality of even numbered electrically conductive segments each being adapted to be secured to a corresponding end of a rotor wire, said segments being arranged circumferentially on said body, one of the ends of each of the conductive segments being provided with means for attaching the respective rotor wire thereto, a wedge-shaped cut being provided under every other attachment means whereby each attachment means over the wedge-shaped cut is bent backward to a position in which it is located at a shorter distance from said through hole of the commutator than the adjacent attachments means to thereby substantially eliminate the possibility of short-circuiting between adjacent attachment means.

3,914,633

X-RAY TUBE COMPRISING A LIQUID-COOLED ANODE

Willem Hildebrand Diemer; Gerrit Zwep, and Jan Mulder, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1973, Ser. No. 406,902

Claims priority, application Netherlands, Oct. 28, 1972, 7214642

Int. Cl. H01j *35/12*

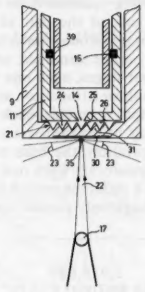
U.S. Cl. 313—32 **6 Claims**

1. In an X-ray tube, an anode comprising:

a wall;

an anode target plate of heat conductive material having on one side thereof a target area for an electron beam and having the opposite side thereof facing said wall with an array of heat conductive projections substantially increasing the heat radiation surface thereof and extending from said plate to said wall effectively forming an interconnected system of ducts around said projections; and

means for directing cooling medium between said wall and plate forcing said medium turbulently through said system of ducts around said heat conductive projections, thereby cooling said target area.



3,914,634

CHANNEL PLATE ACTING AS DISCRETE SECONDARY-EMISSIVE DYNODES

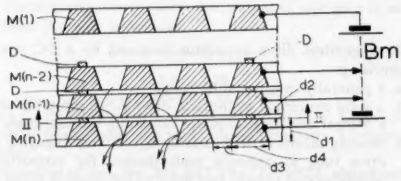
Colin Douglas Overall, and Derek Washington, both of Salfords near Redhill, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 21, 1972, Ser. No. 317,411

Claims priority, application United Kingdom, Dec. 23, 1971, 59966/71

Int. Cl.² H01J *43/10*

U.S. Cl. 313—105 **12 Claims**

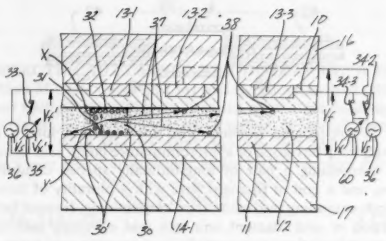


1. A channel plate comprising a laminated structure of perforate electrically conducting metal layers having aligned apertures defining channels, said metal layers being spaced from each other by a distance less than the thickness of said metal layers by uniformly distributed arrays of mutually spaced individual separator elements that do not surround or block individual apertures of said metal layers, the material of said separator elements being substantially less conductive than said metal layers, thereby allowing said metal layers to be maintained at successively higher electrical potentials in order to act as discrete secondary-emissive dynodes, said uniformly distributed arrays of mutually spaced individual separator elements accurately maintaining said metal layers in a parallel relationship even though the coefficients of thermal expansion of the material of said separator elements and said metal be different and a temperature change occurs.

3,914,635
GASEOUS DISCHARGE DISPLAY/MEMORY DEVICE WITH IMPROVED MEMORY MARGIN

Wolfgang W. Bode, Sylvania, and Michael E. Fein, Toledo, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 185,432, Sept. 30, 1971, abandoned. This application Sept. 26, 1972, Ser. No. 292,437
Int. Cl.[2] H01J 61/16
U.S. Cl. 313—226 3 Claims

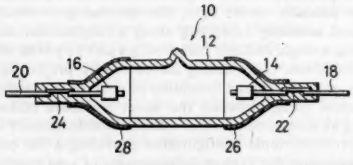


1. In a process for operating a gas discharge display/memory device containing an ionizable gaseous medium, the device having at least two opposed arrays of electrodes with at least one array being insulated from the gaseous medium, the improvement which comprises decreasing the minimum applied voltage sufficient to sustain a gas discharge once initiated and increasing the memory margin of the device by incorporating into the ionizable gaseous medium at least about 0.01% atoms of helium based on the total amount of gaseous medium after the addition of the helium.

3,914,636
DISCHARGE LAMP

Minoru Sugiura, Tokyo, and Kyou-Ichi Maseki, Gyohda, both of Japan, assignors to Iwasaki Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1974, Ser. No. 466,647
Claims priority, application Japan, May 10, 1973, 48-51173
Int. Cl.[2] H01J 61/18
U.S. Cl. 313—229 4 Claims

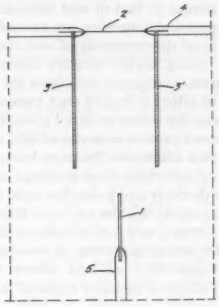


1. An additive-type mercury discharge lamp which includes an arc tube comprising a radiation-transmitting sealed tubular body, a pair of electrodes respectively arranged at the opposite ends of said body, a lead-out conductor connected electrically to each electrode, and a discharge-sustaining filling of preselected materials in predetermined amounts enclosed in said body and including mercury, a rare gas, and at least one halogen in elemental form or in the form of a metal halide, at least one of said electrodes being coated with at least one rare earth metal oxide, and said filling also including a substance that reacts with said rare earth metal oxide, during operation of the lamp, to form a halide of said rare earth metal.

3,914,637
METHOD AND APPARATUS FOR FOCUSING AN ELECTRON BEAM

Willard H. Bennett, Raleigh, N.C., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 29, 1974, Ser. No. 464,875
Int. Cl.[2] H01J 29/46
U.S. Cl. 313—230 1 Claim

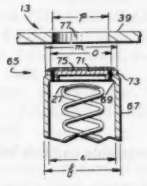


1. In an electron discharge device a cathode and anode with an electron beam flowing therebetween, apparatus for automatically self-focusing the electron beam, comprising an anode and a cathode in said electron discharge device, said cathode projecting a discharge toward said anode in the form of an electron beam, only said anode and cathode being at high currents and voltages, and a multiplicity of elongated ion producing dielectric rods arranged symmetrically around the axis of symmetry with each of said dielectric rods being selectively doped and each being held at one end in said anode, the initial discharge from said cathode spreading out radially to strike said multiplicity of elongated ion producing dielectric rods resulting in the supplying of ions in all directions from the multiplicity of dielectric rods to supply ions near the axis of symmetry for the magnetic self-focusing of the primary high energy, high current beam from said cathode.

3,914,638
CATHODE STRUCTURE FOR CATHODE RAY TUBE

Floyd K. Collins, and John J. Miller, both of Seneca Falls, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Continuation of Ser. No. 256,431, May 24, 1972, abandoned. This application Sept. 4, 1973, Ser. No. 393,970
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] H01J 1/94, 19/48
U.S. Cl. 313—270 4 Claims



1. An improved two-piece indirectly heated end-emissive cathode structure having a jointure region of minimum mass for use in a cathode ray tube, said cathode structure comprising:

a tubular cathode sleeve formed of a substantially passive cathode material having top and bottom open ends and a

sidewall portion therebetween and dimensioned to accommodate associated thermionic heater means therein, said bottom end of said tubular cathode being formed for affixation to cathode support means;

a narrow terminal ledge extremitally formed to be perimetrically instanding at the open top end of said sleeve in a manner whereof said ledge is formed substantially normal to the sidewall of said sleeve;

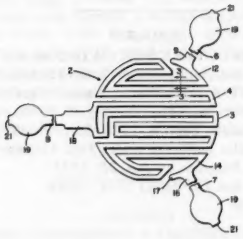
a substantially planar disc-shaped closure member formed of a substantially active cathode material having a perimetric shape similar to that of said cathode sleeve and a transverse diametrical dimension not exceeding the external cross-sectional dimentioning of said sleeve, said closure member being seated directly upon said narrow ledge to facilitate contiguous affixation thereto; and

bonding means to effect a limited area transverse terminal jointure between the active material closure member and the ledge oriented passive material of said cathode tubular member, said transverse jointure being peripherally oriented and of minimum mass prevents doming of the planar closure member and promotes rapid heating of the cathode while minimizing the heatsink characteristics of the cathode structure, said active material closure portion providing a flat substrate having an area approximating the cross-sectional area of said sleeve whereupon a coated area of electron emissive material is subsequently disposed.

3,914,639
HEATER UNIT FOR CATHODE

Anthony J. Barraco, 5499 Blossom Tree Lane, San Jose, Calif. 95124, and Martin E. Wolfe, 2121 Stratford Way, San Mateo, Calif. 94403

Filed Apr. 5, 1974, Ser. No. 458,112
Int. Cl.² H01J *1/88, 17/42*
U.S. Cl. 313—271 **13 Claims**



1. An electrically energizable cathode heater unit comprising:

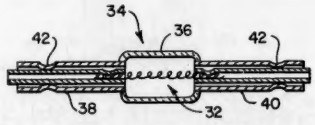
a. an elongated electrically resistive filament formed from a sheet of suitable material to provide a plurality of serially connected turns arranged in serpentine fashion; and

b. a pair of support legs formed from the same sheet of suitable material as the filament and integral with selected portions of said filament and adapted to function also as electrically conductive terminal leads for said heater unit.

3,914,640
INCANDESCENT LAMPS HAVING PREFORMED FILAMENT UNITS

Donald J. Belknap, P.O. Box 325, Mountain Home, N.C. 28758

Division of Ser. No. 147,747, May 28, 1971, Pat. No. 3,762,900. This application June 22, 1973, Ser. No. 372,535
Int. Cl.² H01K *1/02*
U.S. Cl. 313—315 **9 Claims**

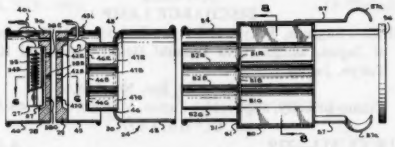


1. A pre-formed filament unit for insertion into a preformed lamp envelope of a microminiature lamp, said filament unit comprising a pair of longitudinally spaced conductive tubes, and a coil of filament wire with a plurality of turns at its ends extending into said tubes, respectively, formed before insertion of said filament unit into said envelope said tubes having indentations substantially compressing said turns and joining said coil to said tubes mechanically and electrically.

3,914,641
ELECTRON GUN CONSTRUCTION FOR MULTI-BEAM COLOR CATHODE RAY TUBE

Adrian W. Standaart, 5 Bonbrook Circle, Winston-Salem, N.C. 27106

Continuation of Ser. No. 272,795, July 18, 1972, Pat. No. 3,771,002. This application June 13, 1973, Ser. No. 369,474The portion of the term of this patent subsequent to Nov. 6, 1990, has been disclaimed.
Int. Cl.² H01J *29/32, 31/20*
U.S. Cl. 313—411 **16 Claims**



1. An electron gun for producing at least one electron beam to excite phosphors in a phosphor screen area of a cathode ray tube to produce visible light, the electron gun forming an elongated assembly extending along a longitudinal axis and including a single cathode comprising a pair of joined metallic sheet members, each having an outwardly projecting truncated V-shaped channel formation projecting outwardly from a common plane between the sheet members collectively defining an elongated six-sided channel of substantially honeycomb cross-sectional configuration providing a flat emission panel spanning the cathode transversely of said longitudinal axis along a longitudinal panel axis, the channel housing filament wire along the length thereof, a coating of electron emission material on said emission panel which is thermally activated to emit electrons for forming the electron beam, control grid and first anode elements in spaced planes paralleling the plane of said emission panel and each having a hole for the electron beam for controlling and shaping the electrons emitted by the cathode into the beam, the holes in said grid and first anode elements for the electron beam being axially alined along a beam axis extending substantially perpendicular to said emission panel electrically conductive material about said holes, means defining electrically conductive paths for applying selected electrical potentials to said conductive material for the holes, the control grid being formed of a noncon-

ductive substrate panel having said hole for the electron beam extending therethrough and having a rearwardly facing recess in the center region of the substrate to receive the cathode channel formation in partially nested relation therein, the hole in said control grid for said beam being positioned so that it opens into said recess, accelerating anode means for accelerating the electrons in said beam toward said phosphor screen area, a plurality of elongated supporting members, and connecting elements extending from the supporting members for rigidly supporting the cathode and control grid and first anode elements and accelerating anode means therefrom.

3,914,642
ELECTRICAL LUMINESCENT DISPLAY DEVICES

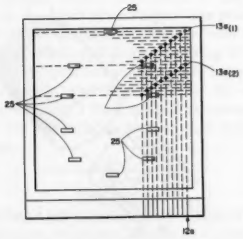
William Michael Coderre; Carl Neil Berglund, both of Ottawa, and Philip Robert Tillman, Kanata, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada

Filed May 17, 1973, Ser. No. 361,347

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H01J *1/62*

U.S. Cl. 313—514 **8 Claims**



1. An electrical luminescent display device comprising:
- a substrate and a transparent cover member spaced from the substrate to form an enclosed chamber;
- a first grid of electrodes on said substrate;
- a first dielectric layer comprising an insulating layer on the electrodes of said first grid;
- a second grid of electrodes overlying said first grid;
- means connecting each electrode of said first grid to a series of electrodes of said second grid, a different series of electrodes of said second grid connected to each electrode of said first grid;
- an electroluminescent fluid in said chamber in contact with the electrodes of said second grid;
- a second dielectric layer in overlying relationship with said second grid;
- apertures in said second dielectric layer, said apertures aligned with the electrodes of said second grid to form a plurality of predetermined patterns;
- an additional electrode electrically connected to the electrodes of said second grid by said electroluminescent fluid;
- means for connecting an alternating driving voltage to said additional electrode and to individual electrodes of said first grid.

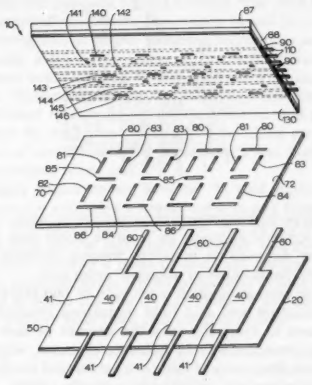
3,914,643
MULTI-SEGMENT DISPLAY PANEL WITH ANODE GROUPS

George A. Kupsky, Milford, N.J., assignor to Burroughs Corporation, Detriot, Mich.

Continuation of Ser. No. 316,303, Dec. 18, 1972, abandoned, which is a continuation of Ser. No. 61,645, Aug. 6, 1970, abandoned. This application Sept. 13, 1974, Ser. No. 505,888

Int. Cl.² H01J *61/067, 61/66;* **H05B** *41/14*

U.S. Cl. 313—519 **25 Claims**



4. A display panel comprising
- a gas-filled envelope including an insulating base plate and a top viewing plate spaced therefrom,
- a plurality of cathode electrodes spaced apart and each covering a substantial area of said base plate, said cathodes being adapted to exhibit cathode glow,
- an insulating layer seated on said cathodes,
- a plurality of groups of apertures in said insulating layer, each group of apertures being aligned with and overlaying one of said cathode electrodes to leave selected portions of the cathode electrodes exposed,
- a plurality of strips of conductive material between said insulating layer and said top plate, said strips extending along said groups of apertures and being insulated from each other, and facing said cathodes through the apertures in said insulating layer, and
- means masking first portions of said conductive strips and exposing second selected portions of each whereby each conductive strip has a portion facing and communicating in gas discharge relationship with an exposed portion of each of said cathodes.

3,914,644
ROTARY TUNER FOR CIRCULAR ELECTRIC MODE CROSSED FIELD TUBE

William A. Gerard, Andover, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Apr. 18, 1974, Ser. No. 461,835

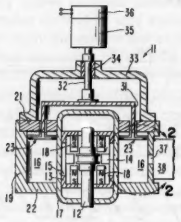
Int. Cl.² H01J *25/50*

U.S. Cl. 315—39.61 **7 Claims**

1. In a microwave tube;
- means for generating a stream of electrons;
- microwave circuit means in energy exchanging relation with said stream of electrons for generating electromagnetic energy;
- cavity resonator means coupled to said circuit means for exciting in said cavity a resonance mode affecting the frequency of said electromagnetic energy;
- tuner means within said cavity for cyclically varying the resonant frequency of said mode of said cavity, said tuner

means comprising a conductive reactive loading structure, a field perturbing structure, and an axis;

said conductive reactive loading structure comprising an array of vanes disposed on a circle about said axis and aligned along radii of said circle such that electric fields of said mode excite electric fields between adjacent vanes whereby said resonance mode is reactively loaded by said vanes;



said field perturbing structure comprising an array of dielectric elements disposed on a circle about said axis and further disposed to intercept fringing portions of said electric fields between adjacent vanes and,

means for producing relative rotation of said reactive loading structure and said field perturbing structure about said axis to cyclically vary the amount of said fringing field intercepted by said dielectric elements, whereby the resonant frequency of said cavity mode and the frequency of said microwave energy are cyclically varied.

3,914,645

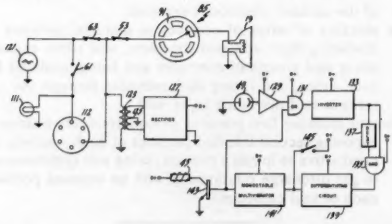
MULTIPLE LAMP UNIT FOR PROTECTION

Kenneth Li Donnici, Brooklyn, N.Y., assignor to Educational & Commercial Avcom Inc., Malverne, N.Y.

Filed July 12, 1974, Ser. No. 487,918

Int. Cl.² H05B *37/04, 39/10*

U.S. Cl. 315—89 **10 Claims**



1. In a projector for projecting visual images recorded on film a multiple lamp unit for supporting and energizing a lamp in a working position and for automatically transporting a fresh lamp into said working position after the lamp in said working position burns out comprising:

a plurality of lamps

a support member movably mounted for supporting said plurality of lamps and for serially moving said lamps through said working position;

motive means for moving said support member in a first direction;

electrically powered escapement means for holding said member with one of said lamps in said working position and for selectively incrementing said support member in two stages first through a major portion of the distance between adjacent lamps and then through the remaining minor portion of said distance to bring said successive lamps into said working position, said escapement means requiring for operation at least a predetermined minimum level of electrical power supplied thereto;

means for energizing said lamp in said working position;

common means for supplying electrical power both to the lamp in said working position and to said escapement means;

means sensitive to the failure of the lamp in said working position for initiating the action of said escapement means to increment said support member including first delay means for preventing the actuation of said escapement means during a gradual reduction in the level of electrical power supplied by said common means when the projector is operating in a fade out mode until said level is below that necessary to operate said escapement means and second delay means for preventing the incrementing of said support member through said remaining minor portion until a predetermined time after the incrementing through said major portion; and

means for removing power from said lamps during at least said major portion of the incrementing of said lamps.

3,914,646

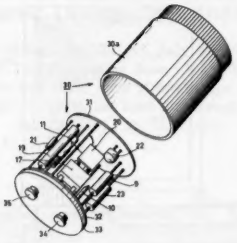
STARTER FOR AN ELECTRIC DISCHARGE LAMP

Jean Pierre Paupy, Arnieres-sur-Iton, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 17, 1974, Ser. No. 479,903

Int. Cl.² H05B *41/04, 41/18*

U.S. Cl. 315—103 **9 Claims**



1. A starter for an electric discharge lamp comprising, a right circular cylindrical envelope, a first disc made of a synthetic material and extending in a direction at right angles to the direction of length of the envelope, a second disc which is made of a synthetic material and extends in a direction at right angles to the direction of length of the envelope, an electric circuit element of the starter forming part of a mechanically rigid electric conductor which is disposed between the two discs and extends in a direction at right angles to the discs and is secured thereto, and a semiconductor switch element which is part of the starter and is disposed between the two discs.

3,914,647

LIGHT SENSOR FOR USE WITH ELECTRONIC FLASH UNITS

Bert Broekstra, Denver, and Dennis J. Wilwerding, Littleton, both of Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 29, 1974, Ser. No. 456,290

Int. Cl.² H05B *37/00*

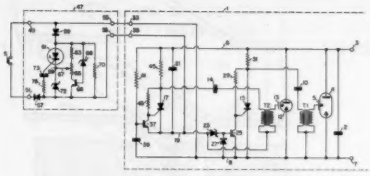
U.S. Cl. 315—241 P **4 Claims**

1. For use with an electronic flash unit, a light sensor comprising

first and second terminals for receiving a reference potential and a signal line potential, respectively, from the flash unit, said signal line potential exhibiting a flash-initiated enabling command change with respect to said reference potential when said flash unit is selectively rendered operative;

light responsive integrating means and switching means connected to said terminals and rendered capable by said signal line potential of being switched from a first state to a second state by a triggering effect only after said signal line potential achieves a first predetermined level during said enabling command change;

a threshold signal arrangement connected to said terminals and to said means for supplying to the latter a threshold signal derived from said signal line potential when the latter achieves a second predetermined level, which is higher than said first level, during said enabling command change;



said means being operative upon receiving a predetermined quantity of light in the presence of said threshold signal to produce a triggering effect which causes said means to switch to said second state for an appropriate time period; and

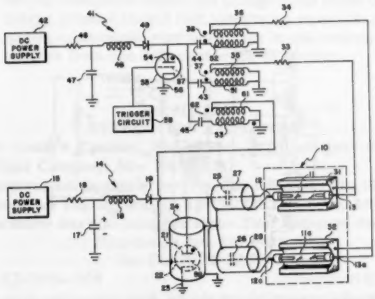
a reference voltage device connected to said means and responsive to the level of said signal line potential to bias said means, and to prevent said means from experiencing any triggering effect and from switching to said second state, while said signal line potential lies between said first and second levels, and responsive to the state of said means for producing a flash quench command change in said signal line potential as long as said means is in said second state.

3,914,648

FLASHLAMP DISCHARGE CIRCUIT

Herbert W. Friedman, Peabody; Robert F. Caristi, Stoneham, and Richard G. Morton, Revere, all of Mass., assignors to Avco Everett Research Laboratory, Inc., Everett, Mass.

Filed May 10, 1974, Ser. No. 468,826
Int. Cl.² H05B *37/00*
U.S. Cl. 315—241 P **8 Claims**



1. Apparatus for operating a gas filled flashlamp discharge device having a pair of opposed electrodes comprising:

a. main discharge circuit means including a high current flow path and first fast-acting electrically actuated switching means, said switching means having a delay time not greater than about a microsecond, said discharge circuit means being coupled to said electrodes for supplying to said electrodes through said high current flow path pulses of high current flow sufficient to operate said flashlamp device at a predetermined level of optical radiation, the said flow path for said high current flow including electrically conductive metallic means disposed immediately adjacent and extending substantially the length of said flashlamp device, a main discharge capacitor, and said first switching means, said flow path comprising a forward current flow path to one of said electrodes of said flashlamp device and a return flow path from the other of said electrodes, said return flow path being in close proximity, equal and opposite to said forward flow path to provide substantially minimum inductance in said flow path;

b. ionizing circuit means including second fast-acting electrically actuated switching means, said ionizing circuit means being coupled to said electrodes for supplying to said electrodes pulses of high voltage low current flow sufficient to at least substantially ionize said gas within about the delay time of said first switching means with a level of optical radiation substantially less than said predetermined level; and

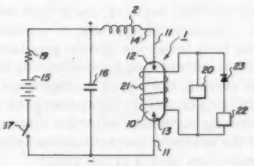
c. trigger circuit means actuated by said ionizing circuit means for supplying a trigger pulse to and triggering said first switching means and couple said pulses of high current flow to said said electrodes after said gas has been ionized whereby a pulse of said high current flow from said main discharge circuit is coupled to said electrodes only at about the end of each pulse of said high voltage low current flow from said ionizing circuit.

3,914,649

PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS

William F. Hug, Pasadena, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed May 6, 1974, Ser. No. 467,343
Int. Cl.² G03B *27/54*; **H05B** *41/34*
U.S. Cl. 315—241 R **7 Claims**



1. Apparatus for forming a latent electrostatic charge pattern on a photoconductive insulating medium, said latent electrostatic charge pattern corresponding to the radiation pattern projected from an information bearing member comprising:

a charged photoconductive insulating member,

a low pressure metal vapor source for generating radiation of a predetermined spectral line, said information bearing member being interposed in the optical path between said metal vapor source and said charged photoconductive insulating member, and

means for operating said low pressure metal vapor source in a pulsed mode whereby pulses of radiation are emitted therefrom, a radiation pulse exposing said information bearing member to selectively dissipate the charge on the surface of said photoconductive insulating member in accordance with the intensity of the radiation pulse projected from said information bearing medium to form said latent electrostatic charge pattern.

3,914,650

TELEVISION DISPLAY APPARATUS PROVIDED WITH A CIRCUIT ARRANGEMENT FOR GENERATING A SAWTOOTH CURRENT THROUGH A LINE DEFLECTION COIL

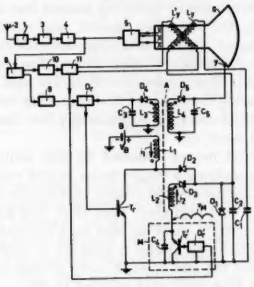
Oswald Johannes Verbeij, Eindhaven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 4, 1973, Ser. No. 421,514

Claims priority, application Netherlands, Jan. 2, 1973, 7300001

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **10 Claims**



1. Television display apparatus provided with a circuit arrangement for generating a sawtooth current through a line deflection coil forming part of a resonant network also including a trace capacitor and a retrace capacitor, switching means for applying the voltage across the trace capacitor to the deflection coil at the line frequency during the trace time of the sawtooth current, said switching means being blocked during the retrace time, a first current loop comprising a winding of an inductive element and a controllable switch for supplying energy originating from a direct voltage source to the inductive element during the conduction period of the switch and a second current loop comprising a diode and a winding of said inductive element which is connected through the diode to the resonant network and a field deflection current generator, characterized in that a modulation source controlled by the field deflection current generator is incorporated in the second current loop for modulating the amplitude of the sawtooth current, the circuit arrangement furthermore including a stabilizing circuit for maintaining the amplitude of the voltage occurring across the inductive element during the retrace time of the sawtooth current substantially constant by varying the conduction period of the switch.

3,914,651

CATHODE, RAY TUBE STRUCTURES

Clayton A. Washburn, 24 Andrea Lane, Thornwood, N.Y. 10594

Continuation of Ser. No. 75,275, Sept. 24, 1970, abandoned, which is a division of Ser. No. 613,830, Feb. 3, 1967, abandoned. This application Mar. 12, 1973, Ser. No. 340,167

Int. Cl. H01j *29/20*

U.S. Cl. 315—371 **10 Claims**

1. A cathode ray tube comprising

an envelope having a face plate,

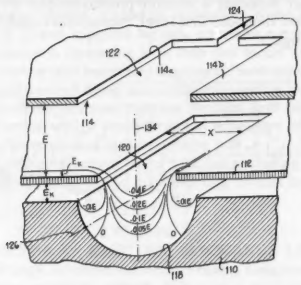
a cathode ray gun structure within said envelope and having electrodes for creating and directing toward said face plate a beam of electrons, some of said electrodes comprising minor beam deflection electrodes for minor electrostatic deflection of said beam, said gun structure including means for coupling a minor beam deflection control signal at a low voltage level to said minor beam deflection electrodes,

major beam deflection means including means for developing a magnetic field for deflection of the electron beam across said face plate,

said face plate having a curved inner surface defined by a radius of curvature R and whose center of curvature is positioned substantially on the center of said magnetic deflection field,

a pattern of heavy-density elements supported on said face plate,

a conductive film of light-density electron permeable material covering said heavy density elements to augment



cathode ray beam bombardment emission of secondary electrons at the positions of said heavy density elements, electrodes in said tube adjacent said face plate for receiving electrons from said beam and secondary electrons, and

circuit means coupled to said electrodes adjacent said face plate and to said conductive film and responsive to said secondary electron emission for development of an output electrical signal.

3,914,652

COLOR TELEVISION DISPLAY APPARATUS PROVIDED WITH A MODULATOR FOR GENERATING A CORRECTION CURRENT FOR CORRECTING DEFLECTION ERRORS

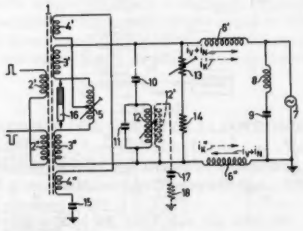
Leonardus Albertus Antonius Valkestijn, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 300,455, Oct. 25, 1972, abandoned. This application Feb. 8, 1974, Ser. No. 440,716

Claims priority, application Netherlands, Nov. 17, 1971, 7115868

Int. Cl.² H01J *29/56*

U.S. Cl. 315—371 **9 Claims**



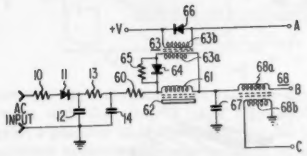
8. A circuit for line and field deflection coils, said circuit comprising a line and field deflection current generator means for applying a substantially sawtooth current of line and field frequency and having a substantially constant peak-to-peak amplitude to said line and field deflection coils; respectively, a modulator means for generating a correction current for correcting astigmatic deflection errors, means coupled to said modulator means for applying said correction current to at least one of said deflection coils, and means for North-South

raster correction comprising a selective network coupled to said modulator and means for integrating coupled between said network and said field deflection coil.

3,914,653
VOLTAGE REGULATOR FOR DEFLECTION CIRCUIT

Gerhard Forster, Wuerenlos, and Hans Keller, Horgen, both of Switzerland, assignors to RCA Corporation, New York, N.Y.

Filed May 14, 1973, Ser. No. 359,947
Claims priority, application United Kingdom, May 18, 1972, 23542/72
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H01J *29/70*
U.S. Cl. 315—389 **8 Claims**



1. A voltage regulator for a deflection circuit including a commutating switch for causing transfer of energy to a commutating network during a first portion of each deflection cycle for supplying energy to a deflection winding during a second portion of each deflection cycle, said regulator comprising:

a direct current voltage source;

first inductance means coupled to said commutating switch;

second variable inductance means coupled to said first inductance means and to said source of direct current voltage;

capacitance means coupled to said second inductance means to form a resonant circuit therewith for coupling energy from said direct current voltage source to said first inductance means;

a source of undesirable voltage variations in said deflection circuit; and

means coupled to said source of voltage variations and to said second variable inductance means and responsive to said voltage variations for varying the inductance of said second inductance means for changing the phase of said energy coupled to said first inductance means for maintaining substantially constant energy in said commutation network from one deflection cycle to another.

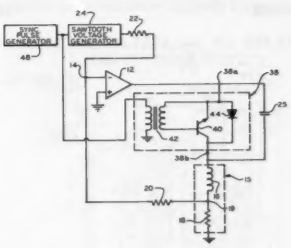
3,914,654
DEFLECTION AMPLIFIER

John Andrew Cooksey, Binghamton, N.Y., assignor to The Singer Company, New York, N.Y.

Continuation-in-part of Ser. No. 268,038, June 30, 1972, abandoned. This application Apr. 6, 1973, Ser. No. 348,495
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H01J *29/70*
U.S. Cl. 315—408 **5 Claims**

1. In combination with an electronic system wherein an amplifier with an input voltage having a variable but generally rising waveform causes a current having the same wave shape to flow through an inductor coil thereby generating a magnetic field to deflect the beam of a CRT, said system having a retrace capacitor to conserve the energy stored in the inductor and a non-reactive feedback path by which a sample of the output signal developed across a resistor is returned to the input circuitry comprising:

switching means operable to connect said retrace capacitor in series with said amplifier and said inductor during retrace time, the current conduction path for the transfer and retransfer of energy between said inductor and capacitor thereby being through said amplifier; and further



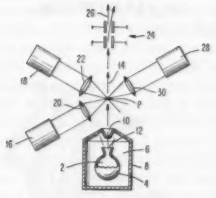
operable to disconnect said retrace capacitor such that the said amplifier output is connected directly to said inductor during trace time; and

synchronizing means operable to control the time of start of said input voltage waveform and the operation of said switching means.

3,914,655
HIGH BRIGHTNESS ION SOURCE

Russell Warren Dreyfus, Cross River, and Rodney Trevor Hodgson, Somers, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 28, 1973, Ser. No. 374,457
Int. Cl. H01j *37/08*
U.S. Cl. 317—4 **4 Claims**



1. A generator of a high quality, high brightness ion source comprising a stream of particles, consisting of atoms, molecules or ions,

a plurality of laser beams intersecting said stream of particles in a region in said ensemble of particles, one of said lasers being equal to a resonant frequency of the particles in said ensemble so as to excite them to an excited state, the frequency of a second laser being equal to a frequency that will excite said excited state of the particles to a second excited state of a higher energy than said first excited state, and

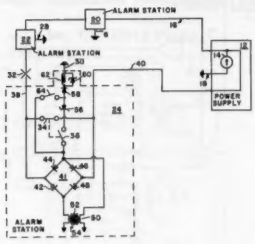
the frequency of any other focused laser beam in said plurality of laser beams being chosen to excite each previously excited state to a higher energy state until the ionization limit of the ensemble of particles is reached, all such excitations not interfering with the direction of said stream of particles when such ionization limit is reached, and

means for separating such created high quality, high brightness ions from any other particles in said stream for application to any utilization device requiring such bright ion source.

3,914,656
AUTOMATIC GROUNDING SYSTEM

Ralph Isaac Hirschhorn, Spring Valley, N.Y., and Gurcharan Singh Bhusri, Wayne, N.J., assignors to North American Philips Corporation, New York, N.Y.

Filed Apr. 26, 1974, Ser. No. 464,630
Int. Cl.² H02H *3/20*
U.S. Cl. 317—9 R **18 Claims**

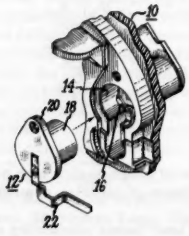


1. A method for completing a broken transmission line between first and second stations comprising sensing at said first station when said line has been broken, supplying a constant current to at least one side of said line and ground, and grounding said second station upon said supplying of said current by exceeding the threshold voltage of a solid state element, whereby said transmission line is completed through ground.

3,914,657
OVERVOLTAGE SURGE ARRESTER FOR ELECTRIC METERS

Roland J. Melanson, Rochester, N.H., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 19, 1973, Ser. No. 416,746
Int. Cl.² H02H *9/06*
U.S. Cl. 317—61.5 **5 Claims**



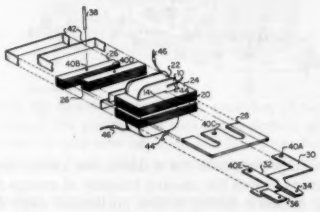
1. An electrical meter of the type having a meter movement enclosed in a case, the case comprising an insulating baseplate through which pass two or more conducting members for supplying electrical current to the movement, and an overvoltage surge arrestor electrically connected between the conducting members and ground potential, wherein the improvement comprises:

an overvoltage surge arrestor module mounted substantially inside a receiving well that is open to the outside of the baseplate and sealed from the interior of the meter, the module being demountably inserted in the baseplate receiving well, open end first, the module comprising an insulating cup, a conductive electrode member and a disc-shaped wafer of non-linear resistance material, the wafer being closely fitted inside the cup with a bottom face substantially parallel to and spaced from the bottom of the cup, said wafer having a conductive contact layer on both faces, said conductive electrode member being fixed to the cup with an end passing through the wall of the cup to within a predetermined distance from the bottom face of the wafer to form an air gap in series with the non-linear resistance material, and a leaf-spring contact mounted in the bottom portion of the well to make a pressure contact with the top face of the wafer in the module.

3,914,658
COMPACT TRANSFORMER WITH INTEGRAL CONNECTOR

Thomas E. Holden, Scotts Valley, and Mark S. Linsky, Santa Clara, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed July 3, 1974, Ser. No. 485,395
Int. Cl.² H01F *15/10*
U.S. Cl. 317—99 **7 Claims**



1. A transformer comprising:

a bobbin having an aperture therethrough;

a primary transformer winding and a secondary transformer winding wound on the bobbin;

a transformer core having a cental core portion passing through and substantially filling the aperture in the bobbin;

a first one-piece, blade-shaped connector member for making connection with an electrical power outlet and clamped between and in direct contact with the inner surface of the bobbin aperture and the central core portion to restrain movement of the first connector member in the bobbin aperture; and

a second one-piece, blade-shaped connector member for making connection with an electrical power outlet, clamped between the inner surface of the bobbin aperture and the central core portion to restrain movement of the second connector member in the bobbin aperture, and electrically insulated from the first connector member.

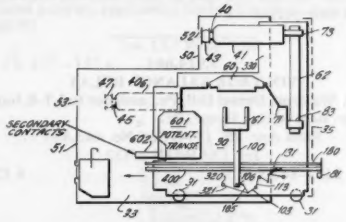
3,914,659
SWITCHGEAR TRUCK-MOUNTED POLYPHASE POTENTIAL TRANSFORMER AND SWITCH APPARATUS

William E. May, Feasterville, and Philip C. Netzel, Milmont Park, both of Pa., assignors to I-T-E Imperial Corporation, Spring House, Pa.

Continuation-in-part of Ser. No. 443,461, Feb. 19, 1974. This application May 9, 1974, Ser. No. 468,376
Int. Cl.² H02B *11/00*
U.S. Cl. 317—103 **5 Claims**

1. A truck-mounted potential transformer for metal clad switchgear; said metal clad switchgear comprising a fixed conductive housing for normally receiving truck-mounted switching apparatus and a multiphase truck-mounted apparatus rackable along a straight line between connected and disconnected positions within said housing; said housing having spaced pairs of fixed disconnect contacts secured thereto for each phase of said siwtchgear for receiving cooperating movable disconnect contacts; said multiphase truck-mounted

apparatus having only a single operable disconnect contact for each phase of said switchgear; at least two of the phases of said truck-mounted apparatus each including a potential transformer means permanently and fixedly mounted thereon and electrically connected to at least one of said fixed disconnect contacts in said housing; said potential transformer means having output terminals for connection to metering circuits; said potential transformer means being movable with said



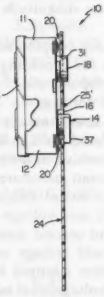
truck-mounted apparatus and being rackable into and out of engagement with the electrical line associated with said switchgear; a plurality of switches fixed on the truck of said truck-mounted apparatus and connected in series with a respective phase of said truck-mounted apparatus; and interlock means connected to said plurality of switches for preventing the racking of said truck-mounted apparatus when said plurality of switches are closed.

3,914,660

CONTROL DEVICE WITH CONTROL KNOB SECURING THE SHIELD COVER

John W. Stearley, Indiana, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed July 22, 1974, Ser. No. 490,511
Int. Cl.² H01R *13/44*; H05K *5/03*
U.S. Cl. 317—118 **8 Claims**



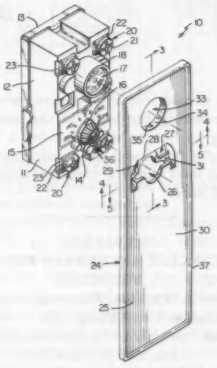
1. In combination, a control device having a housing provided with a selector knob and dial arrangement adjacent said knob, said housing having a control shaft carrying said selector knob, said housing having electrical terminal means adjacent said knob and dial arrangement, and a substantially flat protective shield secured to said control device and covering said terminal means, said shield having opening means therethrough exposing said dial arrangement and having said selector knob projecting therethrough, said knob having a tongue portion bearing on and overlapping over said shield and holding said shield to said control device, said selector knob having a substantially cylindrical part, said tongue portion projecting from said cylindrical part and being disposed at one end of said cylindrical part and said control shaft connected at the other end of said cylindrical part, said cylindrical part of said knob having portions thereof coplanar with said shield for the entire thickness of said shield.

3,914,661

SHIELDED CONTROL DEVICE

Siegfried E. Manecke, and James L. Shaw, both of Indiana, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Aug. 21, 1974, Ser. No. 499,327
Int. Cl.² H05K *5/03*
U.S. Cl. 317—118 **6 Claims**



1. In combination, a control device having a housing provided with a selector knob and dial arrangement adjacent said knob, said housing having electrical terminal means adjacent said knob and dial arrangement, and a substantially flat protective shield secured to said control device and covering said terminal means, said shield having two separate opening means therethrough, one of said opening means exposing said dial arrangement and the other of said opening means having said selector knob projecting therethrough, said shield having a web portion thereof separating said two opening means from each other, said web portion having a part thereof offset relative to said shield by another part thereof, said offset part of said web portion being disposed spaced from and parallel to said shield while engaging against said housing to space said shield therefrom, said offset part of said web portion being disposed between said knob and said housing to lock said shield to said housing.

3,914,662

FAIL-SAFE APPARATUS FOR CHECKING THE PRESENCE OF FLAME IN A BURNER

Gianni Bianchini, Reggio Emilia, Italy, assignor to Societa Italiana Elettronica S.p.A., Milan, Italy

Filed Apr. 18, 1974, Ser. No. 462,190
Int. Cl.² H01H *47/24*
U.S. Cl. 317—124 **13 Claims**

1. A flame control device usable with a detector head exposed to the radiation of a flame to be monitored, said detector head preferably comprising an ionization tube which develops an output signal in the presence of flame, said flame control device comprising:

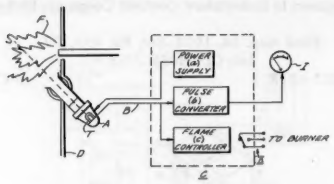
a chain of stages being connected in cascade fashion, each stage including at least one electrical component;

a first stage of said chain being coupled to said detector head;

a first one of all remaining stages including dynamic coupling means to stop the continuous components and to translate only energy given by the alternate components of the input signal;

a second one of said remaining stages including energy storage means for storing energy furnished by said coupling means and generating an electrical signal representative of the signal developed by said detector head;

a third one of said remaining stages including first chopper means for sampling said electrical signal;



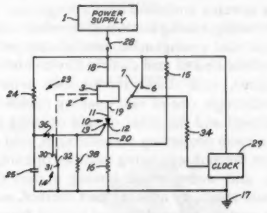
a fourth one of said remaining stages including a threshold circuit measuring the level of the sampled signal, for developing an output signal having a first level in the presence of a flame and for developing an output signal of a second level within a predetermined period after the absence of flame.

3,914,663

TIMING CIRCUIT APPARATUS FOR USE WITH VEHICLES

Lowell A. Johnson, Wheaton, Ill., assignor to Guardian Electric Manufacturing Co., Chicago, Ill.

Filed Apr. 17, 1974, Ser. No. 461,590
Int. Cl.² H01H *47/18*
U.S. Cl. 317—142 R **16 Claims**



1. Timing apparatus for use in a vehicle comprising in combination:

an electrical load;

vehicular generating means for supplying DC voltage and current to the load;

variable resistance means including a first terminal and a second terminal connected at opposite ends of a transconductive path capable of being switched between a conductive state and a nonconductive state and including a control electrode for switching the transconductive path between said states in response to a predetermined gating voltage;

first biasing means interconnecting the electrical load, source and variable resistance means for preventing current flow through the load when the transconductive path is in one of said states and for enabling current flow through the load when the transconductive path is in the other of said states;

timing means for receiving current from the generating means at a first point in time and for generating the predetermined gating voltage;

means for applying the voltage generated by the timing means between the control electrode and the second terminal so that the variable resistance means is switched to one of said states at a second point in time in response to the predetermined gating voltage;

second biasing means for applying a bias voltage to the second terminal and for altering the bias voltage in proportion to the change in voltage of the generating means, whereby the time period between the first and second points in time remains substantially constant irrespective of changes in the voltage of the generating means; and

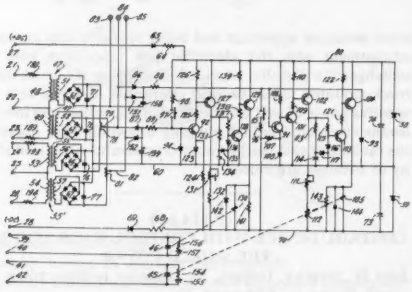
switching means for switching the variable resistance means to the other of said states subsequent to the second point in time, so that a pulse of current is periodically conducted through the load at time intervals displaced by said time period.

3,914,664

VOLTAGE BALANCE RELAY

James E. Waldron, Drexel Hill, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Apr. 25, 1974, Ser. No. 463,889
Int. Cl.² H01H *47/32*
U.S. Cl. 317—148.5 R **6 Claims**



1. A voltage balance solid state relay for continuously monitoring first and second line voltages, said relay comprising:

first isolation means coupled to said first monitored line voltage for providing a first single isolated voltage output proportional to the magnitude of said first monitored voltage;

second isolation means coupled to said second input monitored line voltage for providing a second single isolated voltage output proportional to the magnitude of said second monitored voltage;

voltage comparator-sensor means coupled to said first and second single isolated voltage outputs for producing an output signal responsive to a voltage difference between said first and second monitored voltages, said voltage comparator-sensor means output being adapted to produce an essentially zero voltage continuous output signal when said first and second monitored voltages are substantially equal, said voltage comparator-sensor means output being further adapted to produce a continuous output signal at a voltage level substantially differing from zero volts and having a first polarity when said first monitored voltage is greater than second monitored voltage and having a second opposed polarity when said monitored voltage is greater than said first monitored voltage; and

first and second solid state control means coupled to said voltage comparator-sensor means output and continuously monitoring said comparator-sensor means output wherein the output of said first solid state control means develops a first control output which is continuously present as long as said comparator-sensor means output is of said first polarity and wherein first control output is absent at all other times and wherein the output of said second solid state control means develops a second control output which is continuously present as long as said comparator-sensor means output is of said second polarity and wherein said second control output is absent at all

other times, to thereby provide indications of the relative difference in magnitude of the monitored line voltages.

3,914,665
IGNITION COIL

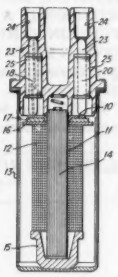
Frederick Stanley Johnson, Stoney Hill, and Kenneth Longstaff, Alcester, both of England, assignors to British Leyland UK Limited, London, England

Filed Apr. 29, 1974, Ser. No. 464,945

Claims priority, application United Kingdom, Apr. 27, 1973, 20105/73

Int. Cl.² F02P 7/00

U.S. Cl. 317—157.6 **4 Claims**



1. An ignition coil comprising a transformer having a relatively small number of primary windings and a relatively large number of secondary windings and at least two reed-type relays each comprising a pair of contacts adapted to be closed or opened by means of a magnetic field; means adapted to provide a magnetic field for opening or closing each relay; one contact of each pair of the relay being adapted for connection to the secondary winding; the other contact of each pair being adapted for connection to a spark plug.

3,914,666
CERAMIC CAPACITOR FOR USE WITH THIN LAYER CIRCUITS

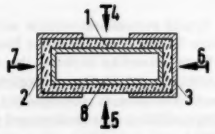
Helfried Schmickl, and Walter Kohlhammer, both of Deutschlandsberg, Austria, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 28, 1974, Ser. No. 455,781

Claims priority, application Austria, Apr. 9, 1973, 11307612/73

Int. Cl.² H01G 1/00, 1/035

U.S. Cl. 317—261 **4 Claims**



1. A ceramic capacitor adapted for use with thin layer circuits comprising a hollow body composed of ceramic material, an inner continuous metal coating lining the hollow interior of said body, said body having a pair of opposed, flat relatively wide sides and two opposed relatively narrow sides, a pair of outer metal coatings, each outer coating covering one of the narrow sides and extending along said relatively wide sides into confronting relation with the other outer coating, the spacing between said outer coatings being at least twice the wall thickness of said hollow body.

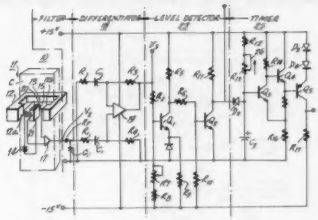
3,914,667
RATE OF RISE TRIPPING DEVICE

James E. Waldron, Drexel Hill, Pa., assignor to I-T-E Imperial Corporation, Spring House, Pa.

Filed Mar. 27, 1972, Ser. No. 238,056

Int. Cl.² H02H 3/08

U.S. Cl. 317—36 TD **1 Claim**



1. Means for initiating a trip operation in response to current conditions of predetermined rise times and persistency in a circuit being monitored, comprising:

first means responsive to the instantaneous current in said conductor for generating a signal representing said instantaneous current value;

second means for differentiating the output of said first means to generate a signal only when the rate of change of the output of said first means is not zero;

low pass filter circuit means for coupling said first and second means to remove high frequency components from the output signal of said second means;

third means coupled to said second means for generating a constant level output only when the output of said second means achieves a predetermined magnitude; said constant level output being maintained only so long as the output of said second means is at least equal to said predetermined magnitude;

timing means coupled to said third means actuated by said constant level signal for initiating a timing period and including means for generating a trip initiating signal a predetermined time interval after said third means generates an output if said constant level output persists for a period at least as long as said predetermined time interval;

said third means including means for instantaneously resetting said timing means when the rate of rise of the output of said first means is zero;

said timing means including adjustable means for setting said predetermined time interval to be insensitive to rate of rise changes which fail to persist for said predetermined time interval;

said timing means includes a capacitor coupled to said adjustable means and adapted to be charged by said constant level output at a rate which is a function of the value of said adjustable means, and to be instantaneously discharged by said third means when said constant level output is terminated.

3,914,668
REEL MOTOR CONTROL CIRCUIT IN A TAPE RECORDER

Hiroshi Okamoto, Kawagoe, Japan, assignor to TEAC Corporation, Musashino, Japan

Filed Feb. 28, 1974, Ser. No. 447,026

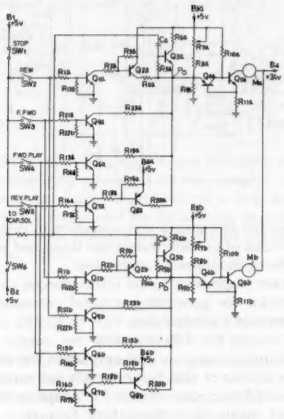
Claims priority, application Japan, Mar. 7, 1973, 48-26849, Aug. 14, 1973, 48-91077

Int. Cl.² B65H 59/38

U.S. Cl. 318—7 **4 Claims**

1. A reel motor control circuit in a tape recorder having changeable operational modes including a tape travel stopping mode and a tape traveling mode including a tape playing mode and having two tape reels, said reel motor control circuit

comprising: two reel motors for applying rotational torques respectively to said two reels for alternately supplying and taking up a tape depending on the operational mode; a circuit for applying a first voltage to that one of said two reel motors supplying the tape thereby to generate in said one reel motor a rotational torque in the rotational direction opposite to the tape supplying direction thereof; a circuit for applying a second voltage greater than said first voltage to that one of said two reel motors taking up the tape thereby to generate in said



one reel motor a rotational torque in the tape takeup direction; and a circuit for applying third mutually equal voltages respectively to the two reel motors upon the changing of the operational mode from said tape traveling mode to said tape travel stopping mode and in the period thereafter of said tape travel stopping mode, thereby to generate in the two motors equal rotational torques acting in mutually opposite rotational directions, each of said third voltages having a value higher than said first voltage and lower than said second voltage.

3,914,669

SYSTEM FOR ATTENUATING VERTICAL OSCILLATIONS OF A SUSPENDED TRACK BOUND PROPULSION VEHICLE

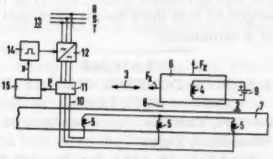
Joachim Holtz, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 31, 1974, Ser. No. 519,681

Claims priority, application Germany, Nov. 13, 1973, 2356679; Feb. 13, 1974, 2406820

Int. Cl.² H02K *41/02*

U.S. Cl. 318—135 **19 Claims**



1. In a track-bound propulsion vehicle system having means for suspending the vehicle above a track and driven by a synchronous linear motor having a stator installed along the track in the form of a traveling field winding and an exciter disposed on the motor vehicle as a translator moving therewith, improved means for attenuating vertical oscillations in the propulsion vehicle comprising:

a. means for supplying the travelling field winding of the synchronous linear motor with an AC voltage which can be varied in amplitude and phase;

b. means for controlling the operation of said means supplying said voltage;

c. means for measuring vertical oscillations in the vehicle and providing an output signal proportional thereto;

d. means having said output signal as an input for developing an attenuation control signal; and

e. means coupling said attenuation control signal to said means for controlling.

3,914,670

APPARATUS FOR DAMPING OSCILLATIONS IN THE PROPULSION DIRECTION IN A MAGNETICALLY SUSPENDED PROPULSION VEHICLE DRIVEN BY A SYNCHRONOUS LINEAR MOTOR

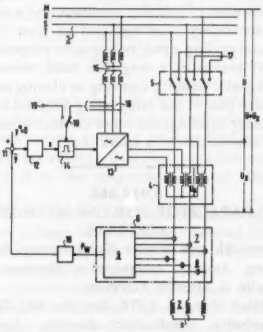
Joachim Holtz, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Nov. 4, 1974, Ser. No. 520,856

Claims priority, application Germany, Nov. 15, 1973, 2357147

Int. Cl.² H02K *41/02*

U.S. Cl. 318—135 **21 Claims**



1. In a track bound propulsion vehicle such as a magnetic suspension vehicle having a synchronous linear motor with a stator supplied from a fixed ac network the stator acting as a travelling field winding and having an exciter disposed in the magnetic suspension vehicle as a comovable translator apparatus for damping oscillations in the forward propulsion direction comprising:

a. measuring means for developing an output signal proportional to the power oscillations of the synchronous linear motor,

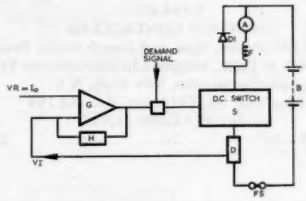
b. means having as an input the output of said measuring means for developing a control signal; and

c. control means providing an ac output voltage at the frequency of the fixed ac network, said output coupled to said travelling field winding so as to be superimposed on the ac network voltage, with the phase ac output voltage of said control means changing in response to said control signal.

3,914,671
CONTROL MEANS FOR ELECTRIC MOTORS OPERATED FROM BATTERIES

John Morton, Hazel Grove; Keith Drummond Stevens, Marple, and Graham Spencer Thexton, Marple Bridge, all of England, assignors to Cableform Limited, Romiley, England

Continuation-in-part of Ser. No. 272,882, July 18, 1972, abandoned. This application Apr. 1, 1974, Ser. No. 457,631
Claims priority, application United Kingdom, Sept. 23, 1969, 46727/69; Feb. 6, 1970, 5741/70; Feb. 7, 1970, 5990/70; Feb. 14, 1970, 7188/70
Int. Cl.² H02P 05/06
U.S. Cl. 318—139 10 Claims



1. Control apparatus for a battery-operated electric motor, said apparatus comprising in combination:

a D.C. motor, detecting means for detecting current and having an output, and a battery, all connected in series and in a closed circuit; D.C. switch means connected in series in said closed circuit for supplying pulsed direct current to the D.C. motor, said D.C. switch means being controllable by a demand signal supplied thereto;

amplifier means for comparing a reference signal corresponding to a predetermined motor current with a second signal corresponding to the output from said detecting means, said amplifier means generating an output only when said current detected by said detecting means is more than said predetermined motor current;

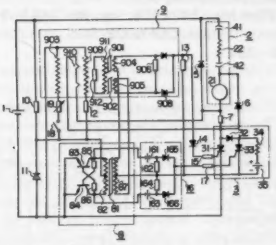
means for receiving said demand signal prior to supply to said D.C. switch means and said amplifier output and for controlling the demand signal supplied to said D.C. switch means so as to limit the output power of said motor whilst enabling the motor current to increase with reduction in speed of said motor.

3,914,672
CHOPPER CONTROL SYSTEM

Hisakatsu Kiwaki; Yoshimitsu Onoda, and Masahiko Ibamoto, all of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 30, 1973, Ser. No. 420,570
Claims priority, application Japan, Dec. 4, 1972, 47-121823
Int. Cl.² H02P 5/06
U.S. Cl. 318—246 9 Claims

1. A chopper control system having a chopper for controlling a current supplied from a d.c. power supply to a load, and means for controlling said chopper, wherein said chopper control means comprises an oscillator and a magnetic phase shifter, and said magnetic phase shifter includes a saturable core, a control winding wound around said core to be applied with a control instruction signal, and an output winding wound around said core to be applied with the output of said oscillator, and further comprising means for deriving a "negation" of the output of said magnetic phase shifter, and means for

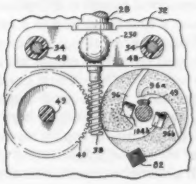


actuating said chopper in response to said "negation" of the output.

3,914,673
STRUCTURAL SPEED CONTROL FOR ELECTRIC MOTORS

Gus Waldemar Wallin, Waterbury, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.

Continuation-in-part of Ser. No. 351,806, April 16, 1973, abandoned, which is a continuation-in-part of Ser. No. 268,619, July 3, 1972, abandoned. This application July 22, 1974, Ser. No. 490,757
Int. Cl.² G05D 13/10; H02P 5/30
U.S. Cl. 318—325 41 Claims

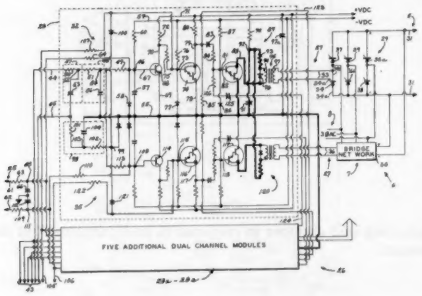


1. In a kitchen mixer having a housing, a motor in the housing, the motor having power line means and a drive shaft terminating in a worm gear, worm wheels engaging either side of the worm gear and each having a downward hub mounted in the housing for rotation, the hubs each having in their underside an upward central recess, the recesses adapted to receive respectively in driving engagement the upper ends of mixer blades; the improvement of one of the worm wheels having a rotary portion carrying a conductive element for rotation therewith, the housing also mounting brush means adapted to engage the conductive element, means for moving the brush means manually in a path of traverse along the conductive element as it rotates under the brush means, the power line means being interrupted and one end being connected to the brush means and the other end being connected to the conductive element, the conductive element being irregular in shape so that as the element rotates, the brush means is in contact with it a greater proportion of the time as the brush means approaches one end of the path of traverse than when it is adjacent the other end, whereby the speed of the motor may be varied by moving the brush means along its path of traverse.

3,914,674
D.C. MOTOR CONTROL HAVING GATING CONTROL OF A FULL-WAVE REACTIFIER SYSTEM

John T. Maynard, New Berlin, Wis., assignor to Armor Elevator Company, Louisville, Ky.

Filed May 10, 1974, Ser. No. 468,860
Int. Cl.² H02P 5/16
U.S. Cl. 318—331 15 Claims



1. A motor control circuit for energizing a D.C. motor from a polyphase power supply to maintain a regulated motor output by a gating system for a plurality of individual rectifier means connected to said power supply in a full-wave rectifying system wherein each of said rectifier means is selectively fired during a given half cycle of alternating current input and commutates during the successive half cycle of the alternating current input; the improvement in pulse generating means for gating of the individual rectifier means comprising a plurality of gating control channels each operative for supplying a gating pulse to one of said rectifier means with each of said channels including first switching means having first input means operatively receiving a selectively variable firing control signal from command means and first output means selectively operable from a first condition to a second condition in response to said firing control signal and connected to second input means of second switching means having second output means selectively operable from a first condition to a second condition in response to said second condition of said first switching means, said second output means providing said second condition to operatively supply an output pulse to said associated rectifier means, said first output of said first switching means of each channel connected to second input means of second switching means of one other channel for operating said other channel and supplying an output pulse to the associated rectifier means of said other channel.

3,914,675
FAULT DETECTOR CIRCUIT FOR ELECTRIC VEHICLE CONTROL

Charles Edward Konrad, Roanoke, Va., assignor to General Electric Company, Salem, Va.

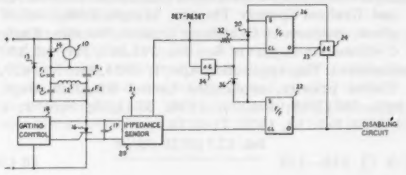
Filed Sept. 17, 1973, Ser. No. 397,984
Int. Cl.² H02P 5/16
U.S. Cl. 318—453 17 Claims

1. Means for disabling an electrical drive system including an electric motor and power switching means for coupling the motor across a source of electrical energy, comprising:

sensing means coupled to the power switching means for producing a fault signal in response to the persistence of conductivity of said power switching means beyond a predetermined period of time;

disable means coupled to said sensing means and operable to interrupt the flow of power to the motor upon reception of a fault signal and to reapply power to the motor after the cessation of said fault signal and the reception of a reset signal;

reset means coupled to said disable means for outputting a reset signal in response to each of a predetermined number of operations of said disable means; and

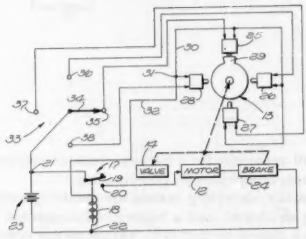


means for transmitting reset signals from said reset means to said disable means.

3,914,676
POSITION CONTROLLER

Vahe Samuel Madonian, Simi, and Joseph Daniel Douglas, La Puente, both of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 22, 1974, Ser. No. 462,759
Int. Cl.² G05B 11/14
U.S. Cl. 318—467 2 Claims



1. A position selection system comprising: a base; a rotary valve fixed relative to said base; a motor fixed relative to said base, said motor having an output shaft which is rotated when said motor is energized, said valve having an input shaft fixed relative to said motor output shaft for movement therewith; an electrically operable brake energizable to unlock said motor output shaft and deenergizable to lock said motor output shaft; a cam fixed relative to said motor output shaft; a plurality of normally closed limit switches fixed relative to said base in positions relative to said cam to be opened one at a time by movement of said cam with said motor output shaft; a common lead, a first side of each limit switch being connected to said common; a manually movable, single-pole, multiple-throw switch having a pole and a plurality of contacts for engagement, one at a time, by said switch pole, said plurality of contacts being connected to respective second sides of said limit switches; and actuation means connected from said switch pole and said common for energizing both said motor and said electrically operable brake in a manner to cause said motor output shaft and said cam to turn continuously until said cam opens one of said limit switches, which one is connected from a corresponding one of said contacts engaged by said switch pole, said one limit switch, when open, breaking the circuit between said pole and said common via said one contact and said one switch, said valve having ports movable to positions in and out of communication with each other, said ports being rotatable with the input shaft to said valve to a plurality of positions in which any fluid flow through said valve is different, said cam and said limit switches being located in a manner such that only one of said limit switches are opened to stop rotation of said motor output shaft when said valve input shaft rotates to one of said plurality of valve positions corresponding to the said one contact, said manually operable

switch being remote from said base, said valve, said motor, said brake, said cam and said actuation means, said manually operable switch remotely controlling said valve position.

3,914,677
PRECISION MOTION CONTROL DEVICE OR THE LIKE

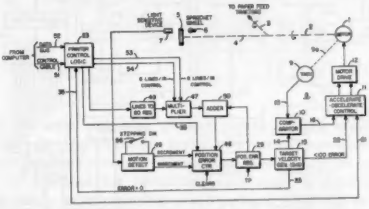
Robert W. MacWade, Philadelphia, and Bernard J. McDevitt, Norristown, both of Pa., assignors to Sperry Rand Corporation, Blue Bell, Pa.

Filed June 8, 1973, Ser. No. 368,397

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G05B *13/00*

U.S. Cl. 318—561 **9 Claims**



1. A paper advance mechanism for a high speed printer, comprising a servo means for moving the printer paper, a sprocket generator coupled to said servo means adapted to generate a multiplicity of sprocket pulses for each line of paper advance, a counter for storing a count which is a predetermined multiple of the lines of paper advance, a register means coupled to said counter for receiving the count stored in said counter, a digital-to-analog converter coupled to said register means for developing an error voltage dependent on the count stored in the register means and for applying said error voltage to said servo means to cause said servo to advance paper, an adder network having two inputs thereto and a summing output, one of said adder inputs being connected to the output of said register means, an input means connected to the other adder input for applying a count signal indicative of the number of lines of paper advance that is to be executed, the summing output of said adder being connected to the input to said counter to load said counter with a count at the start of a paper advance operation, and means utilizing the output of said sprocket pulse generator to decrement said counter as paper is advanced.

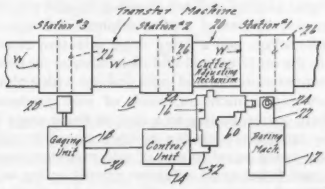
3,914,678
CONTROL SYSTEM FOR COMPENSATING FOR CUTTING MACHINE TOOL WEAR

Lawrence L. Chynoweth, Utica, and Kurt O. Tech, Grosse Pointe Shores, both of Mich., assignors to The Cross Company, Fraser, Mich.

Filed May 16, 1973, Ser. No. 360,669

Int. Cl.² G05B *19/42*

U.S. Cl. 318—568 **6 Claims**



1. For a machine having a tool for machining a surface of a workpiece to a predetermined nominal dimension and a gaging unit for providing an output signal representative of the predetermined dimension after machining, a tool adjustment system comprising:

means responsive to said gaging unit output signal for providing an error signal representative of the magnitude of the deviation between said predetermined dimension after machining and said predetermined nominal dimension;

detecting means responsive to said error signal for detecting first deviations having magnitudes which are less than a first predetermined magnitude of deviation, for detecting second deviations having magnitudes which are greater than said first predetermined magnitude of deviation but less than a second predetermined magnitude of deviation and for providing an output signal representative of said first detected deviations upon each said first detected deviations and an output signal representative of said second detected deviations only after a predetermined number of successive ones of said second detected deviations; and

tool adjusting means being adapted to cooperate with said tool for adjusting said tool, said tool adjusting means being responsive to said error signal and said detecting means output signal for adjusting said tool in accordance with said error signal only after said detecting means output signal indicates that either one of said first detected deviations has occurred or said predetermined number of successive ones of said second detected deviations have occurred so that said tool adjustment is not made after the occurrence of a lesser number of said successive ones of said second detected deviations.

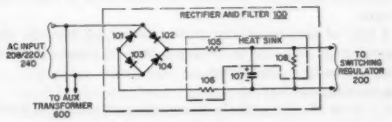
3,914,679
HIGH VOLTAGE TRANSISTORIZED POWER SUPPLY EMPLOYING SWITCHING REGULATOR AND D.C.-A.C. CONVERTER CIRCUITRY

James F. Sullivan, Stow, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Apr. 15, 1974, Ser. No. 461,081

Int. Cl.² H02M *5/453*

U.S. Cl. 321—2 **6 Claims**



1. An electronic power supply comprising:

input rectifier and filter means coupled to an alternating current (a.c.) input to convert said alternating current into direct current, said input rectifier and filter means including electrical storage means for providing ride-through capability for the power supply;

switching regulator means coupled to said input rectifier and filter means, said switching regulator means including a first high voltage transistor with its collector connected to the relatively positive output line from the input rectifier and filter means and its emitter coupled to a first terminal of a choke element for limiting peak currents emitted by the emitter of said first transistor;

means to convert direct current to alternating current coupled to said switching regulator means, said d.c.-a.c. converter means including a second and a third high voltage transistor, a transformer and means to inhibit simultaneous turn-on of said second and said third transistors, said transformer having a primary winding with a center tap connected to a second terminal of said choke element, opposite terminals of said primary winding connected to the collectors of said second and third transistors respectively, the emitters of said second and said

third transistors connected to the relatively negative output line from said input rectifier and filter means, said inhibiting means including a secondary winding of said transformer and a pair of diodes coupled between each terminal of said secondary winding and the base of each of said second and said third transistors respectively;

a plurality of output rectifier and filter circuits, each of which is coupled to said d.c.-a.c. converter means and each of which produces a preselected output voltage;

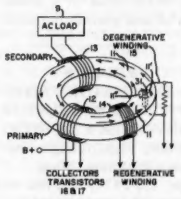
a control loop coupled to said switching regulator means and to at least one of said output rectifier and filter circuits, said control loop providing a regulation signal to said first transistor for varying the duty cycle of said first transistor, said regulation signal responsive to the voltage level of said one output rectifier and filter circuit; and

an auxiliary transformer circuit coupled to the a.c. input and to said control loop, said auxiliary transformer circuit providing power to said control loop before said output voltages have reached their operating levels.

3,914,680
STATIC INVERTER

Joseph P. Hesler, Liverpool, and Samuel M. Korzekwa, Baldwinsville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Jan. 17, 1975, Ser. No. 541,867
Int. Cl.² H02M 7/48
U.S. Cl. 321—18 **17 Claims**



1. A static inverter comprising:

a. input terminals for connection to a source of d.c. potentials,

b. a pair of semiconductor power switching devices, each semiconductor device having a pair of input electrodes and an output electrode,

c. a transformer having

1. a core of substantially linear magnetic material having a closed magnetic path of approximately uniform cross-section with a small aperture introduced into said core to partition the magnetic cross section in a localized region into two branches between which the flux may be steered with a magneto-motive force,

2. a pair of primary power windings encircling the full core cross-section, each coupled between an output electrode of one of said semiconductor devices and said source terminals for generating an alternating flux in said core as said devices are switched,

3. a secondary power winding encircling the full core cross-section to derive an alternating voltage output,

4. first feedback winding means associated with said core and coupled to said input electrodes to provide self-regenerative feedback to each semiconductor device and cross-coupling between semiconductor devices to facilitate commutation;

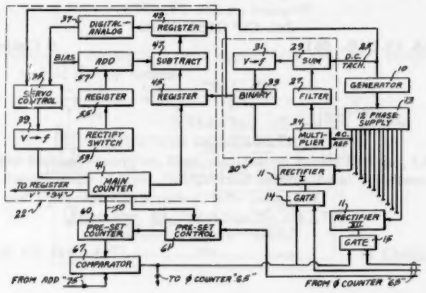
second feedback winding means associated with said core and coupled to said input electrodes to provide self-degenerative feedback to each semiconductor device;

at least one of said feedback winding means being coupled through said aperture to one branch of said core to make the feedback dependent upon saturation of a partitioned branch.

3,914,681
RING MAGNET FIRING ANGLE CONTROL

Martin J. Knott, Lockport; Lloyd G. Lewis, La Grange, and Herbert H. Rabe, Ingleside, all of Ill., assignors to The United States of America as represented by the United States Energy Research & Development Administration, Washington, D.C.

Filed Nov. 6, 1974, Ser. No. 521,418
Int. Cl.² H02M 7/515
U.S. Cl. 321—40 **8 Claims**



1. In a ring magnet power supply having a main generator for developing multiphase AC signals of equal particular frequency, a device for controlling the firing angles of a plurality of sequentially fired rectifiers, each rectifier having applied thereto one of the AC signals, comprising:

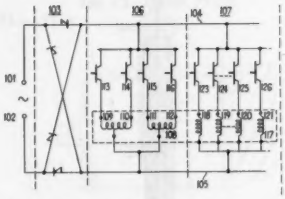
a first voltage-to-frequency converter developing a smooth AC signal of equal period to that of the multiphase AC signals, an analog multiplier coupled to said first converter and the main generator and being responsive to one of said multiphase AC signals and said smooth AC signal to develop a phase difference signal proportional to the product of said one of said multiphase AC signals and said smooth AC signal, said first converter being responsive to the DC component of said phase difference signal to vary the frequency of said smooth AC signal according to the voltage level of said DC component, thereby maintaining said smooth AC signal at a constant phase shift from said one of the multiphase AC signals, a second voltage-to-frequency converter developing a pulsed output signal, a main counter coupled to said second converter and being responsive to said pulsed signal to count and store the number of pulses of said pulsed signal, a comparator coupled to said first converter, said main counter and said second converter and being responsive to the positive zero crossing of said smooth AC signal to develop a DC error signal whose voltage varies according to the difference between the number stored in said main counter and a prescribed number, said second converter being responsive to said DC error signal to vary the frequency of said pulsed signal according to the voltage level of said DC error signal, thereby maintaining said pulsed signal at a constant phase difference from said smooth AC signal and the number of pulses of said pulsed signal per period of one of said multiphase AC signals at a constant value, and a firing angle selection circuit coupled to the rectifiers and said main counter for comparing the number stored in said main counter with a plurality of predetermined numbers, each of said predetermined numbers corresponding to a desired firing angle for one of the rectifiers, with the number stored in said main counter being equal to one of said predetermined numbers, said firing angle selection circuit acting to enable the firing of a particular rectifier at said particular rectifier's desired firing angle, said particular rectifier's desired firing angle corresponding to said one of said predetermined numbers.

3,914,682

SELECTIVE PRINTER POWER SUPPLY ARRANGEMENT

Frederick Percival Mason, deceased, late of Burgess Hill, England (by Margaret Maud Mason, executrix), and Brian Michael Patience, Eastbourne, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Nov. 13, 1974, Ser. No. 523,356
Int. Cl.[2] H02M 7/06
U.S. Cl. 321—47 3 Claims



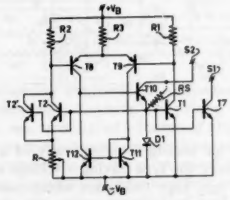
1. A serial selective printer power supply arrangement comprising rectification means for providing unsmoothed unidirectional currents from an alternating current supply, a set of switches for permitting said unidirectional currents selectively to energize, in a set pattern, windings of a print head traversing motor, a further set of switches permitting said unidirectional currents selectively to energize motors in the print head which effect the actual printing of a character and control circuit means including a store for character code signals, whose characters are to be printed, sensing means for detecting the coincidence of a peak of a half-cycle of unidirectional current and a presence of a character code signal in the store, and a store holding an energization program which is enabled by said sensing means when a coincidence as above is detected and causes the print head to be accelerated between the sensed peak and the following zero, to be held in constant motion during the next half-cycle, during which time a character corresponding to the stored character code signal is printed, and to be brought to rest between the zero and the peak of the next half-cycle.

3,914,683

CURRENT STABILIZING ARRANGEMENT WITH RESISTIVE-TYPE CURRENT AMPLIFIER AND A DIFFERENTIAL AMPLIFIER

Rudy Johan van de Plassche, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 18, 1974, Ser. No. 451,783
Claims priority, application Netherlands, Mar. 20, 1973, 7303851
Int. Cl.[2] G05F 1/60
U.S. Cl. 323—1 18 Claims



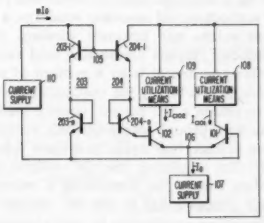
1. A current stabilizing arrangement comprising first and second circuits connected in parallel between first and second common terminals, in which circuits two currents whose magnitudes have a mutually fixed ratio are sustained, the first circuit including the main current path of a first transistor of a first conductivity type, the second circuit including the main current path of a second transistor of said first conductivity type and a first impedance having one end connected to said second transistor and its other end connected to the second common terminal, means interconnecting the control electrodes of the first and second transistor, the first and second parallel circuits further including a second and a third impedance respectively, means connecting the first and second transistors via said scond and third impedances, respectively, to the first common terminal, a differential amplifier having a first and a second input, means connecting the first input of the differential amplifier to the end of the second impedance which is remote from the first common terminal and the second input to the end of the third impedance which is remote from the first common terminal, and means for applying to the control electrodes of the first and second transistors a control signal which is determined by the output signal of the differential amplifier.

3,914,684

CURRENT PROPORTIONING CIRCUIT

Arthur John Leidich, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Oct. 5, 1973, Ser. No. 403,990
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.[2] G05F 3/08
U.S. Cl. 323—4 7 Claims



1. In combination:

first and second transistors, each having base and emitter electrodes with a base emitter junction therebetween and each having a collector electrode, their emitter electrodes being joined at a first interconnection;

first and second conductive paths connecting respective ones of the base electrodes of said first and said second transistors to a second interconnection;

2*n* semiconductor diodes, n of which are included in said first conductive path without other substantial intervening elements and poled for serial forward conduction with said first transistor base-emitter junction, and n others of which are included in said second conductive path without other substantial intervening elements and poled for serial conduction with said second transistor base-emitter junction, n being a positive integer;

a first current supply coupled in circuit with said first conductive path to forward bias each semiconductor junction therein;

a second current supply; and

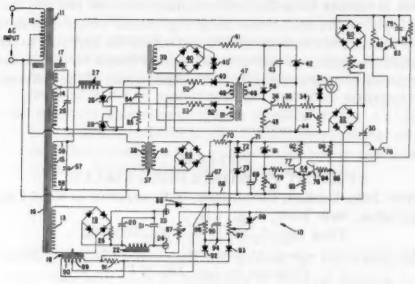
means connecting said second current supply between said first interconnection and each of the collector electrodes of said first and said second transistors, including:

a first current utilization means in the connection of said second current supply to said first transistor collector electrode, the base current flow of said second transistor resulting from the aforesaid connections of the aforesaid elements providing the sole means to forward bias each said semiconductor junction in said second conductive path.

3,914,685
REGULATED FERRORESONANT POWER SUPPLY WITH SOFT START

Burrows C. Van Gilder, North Wales, Pa., assignor to Eltra Corporation, Toledo, Ohio

Filed May 6, 1974, Ser. No. 467,191
Int. Cl.[2] H02P 13/26; G05F 1/64
U.S. Cl. 323—20 6 Claims



1. A regulated DC power supply comprising, in combination, a power transformer including a primary winding for excitation from an externa AC power source, a secondary winding and a resonant winding mounted on a magnetic core, said core having a magnetic shunt between said primary winding and said secondary and resonant windings, a ferrocapacitor connected across said resonant winding, an electronic switch, an inductor, means connecting said switch and said inductor in series across at least a portion of said resonant winding, means for rectifying the voltage across said secondary winding to obtain a DC output, control means for establishing conduction through said electronic switch at a predetermined time in each half cycle to initiate discharging said ferrocapacitor for regulating the DC output, said control means including means for comparing a reference voltage with a voltage proportional to the DC output voltage and means for controlling conduction by said electronic switch in response to such comparison by said comparing means, and timing means for automatically reducing the reference voltage for a predetermined time interval when said primary winding is initially excited from the external AC source, said reduced reference voltage advancing conduction by said electronic switch during each half cycle whereby the voltage across said DC output is initially at a reduced voltage.

3,914,686
WELL LOGGING APPARATUS INCLUDING A RELEASABLE EXTENDIBLE SPRING MEMBER HAVING A WELLBORE WALL ENGAGING CONTACT

Robert A. Brooks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Continuation-in-part of Ser. No. 374,705, June 28, 1972, abandoned. This application Mar. 25, 1974, Ser. No. 454,041
Int. Cl.[2] G01V 3/18
U.S. Cl. 324—10 7 Claims

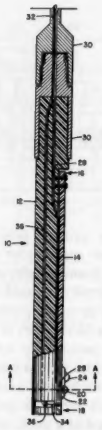
1. A well logging apparatus for determining electrical and electrochemical properties of subterranean formations penetrated by a wellbore over substantially the entire length of the wellbore above a selected location, said apparatus comprising;

a. a support member adapted to be lowered into a well;

b. a releasable extendible arcuate spring member, having a first and a second end, said first end being connected to said support member;

c. a sharpened electrically conductive contact means positioned on said spring member near said second end of said spring member so that said electrically conductive contact means is strongly and substantially continuously urged against the well wall by said spring member when said spring member is in an extended position so that said contact means penetrates said well wall and contacts freshly exposed well wall surfaces;

d. means connected to said contact means for sensing the voltage differential between the portion of said well wall in contact with said contact means and a reference potential; and

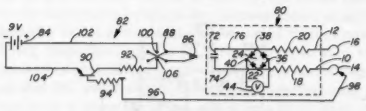


e. means for raising and lowering said support member in said well said contact being maintained in substantially continuous contact with said well wall while said support member is raised in said well.

3,914,687
CONTINUITY TESTING DEVICE FOR A HIGH VOLTAGE MEASUREMENT DEVICE

Marvin W. Bevins, Tulsa, Okla., assignor to M. W. Bevins Co., Inc., Tulsa, Okla.

Filed Apr. 29, 1974, Ser. No. 464,827
Int. Cl.[2] G01R 31/02
U.S. Cl. 324—51 6 Claims



1. Apparatus for testing the continuity of a high voltage measuring device of the type having a voltage sensing means in series with a very high resistance which comprises: a low voltage D-C source, a current limiting resistor, and a transistor; means connecting said D-C source, said current limiting resistor, said voltage sensing means and the emitter-collector portions of said transistor in circuit; and means connecting the high resistance of said high voltage measuring device between said D-C source and the base of said transistor to provide a bias circuit therefor; whereby said transistor will conduct and actuate said voltage sensing means when said high resistance provides electrical continuity.

3,914,688
COLD SPOT DETECTOR FOR LNG TANKS AND TANKERS

Yaacov Lev, Liverpool, England, assignor to Shell Oil Company, Houston, Tex.

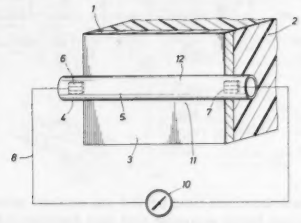
Filed Oct. 1, 1973, Ser. No. 402,555

Claims priority, application United Kingdom, Oct. 4, 1972, 45692/72

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G01N *27/00*

U.S. Cl. 324—71 R **17 Claims**



1. An apparatus for detecting a failure in a cold insulating system comprising:
   - an electrically non-conducting conduit, said conduit being disposed in cold transfer relation with said cold insulating system;
   - an ion-conducting material that will solidify under action of induced cold and having a different conductivity when solid, said conduit being filled with said ion-conducting material;
   - a pair of electrodes, one electrode being disposed at each end of said conduit in contact with said ion-conducting material; and
   - monitoring means, said monitoring means being coupled to said electrodes to monitor the conductivity of said ion-conducting material.

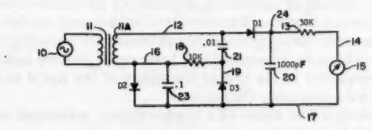
3,914,689
SELF POWERING TEMPERATURE COMPENSATED RECTIFIER FOR MEASURING CURRENT

Charles S. Wright, 7901 Jansen Court, Springfield, Va.

Filed May 6, 1974, Ser. No. 467,581

Int. Cl.² G01R *19/22, 21/10*

U.S. Cl. 324—119 **6 Claims**



1. A self-powering temperature compensated rectifier for measuring alternating currents comprising a first lead for connection to one terminal of a source of alternating current, a first solid state diode having one terminal connected to said first lead for connection to one terminal of a source of alternating current, a metering means, a first output lead connected between the other terminal of said first solid state diode and one terminal of said metering means, a second lead for connection to the other terminal of said source of alternating current, a second solid state diode opposed to said first diode and having one terminal of said second diode connected to said other lead from said source of alternating current, a second output lead connected between the other terminal of said second diode and the other terminal of said metering means, a first capacitor connected between said first output lead and said second output lead, a resistor having one terminal connected to said second lead for connection to the other terminal of said source of alternating current, a junction having one terminal connected to the other terminal of said resistor, a second capacitor connected between said first lead from said source of alternating current and said junction, a third solid state diode having one terminal connected to said second output lead, the other terminal of said third diode being connected to said junction, a third capacitor connected between said second lead for connection to the other terminal of said source of alternating current and and said second output lead whereby said third diode provides current to said second diode with all of the power for said self powering temperature compensated rectifier being supplied solely by the said source of alternating current being measured, the said one terminals of each diode being of the same polarity and the other terminals of each diode being of the opposite polarity.

3,914,690
SCR AND DIODE TESTER

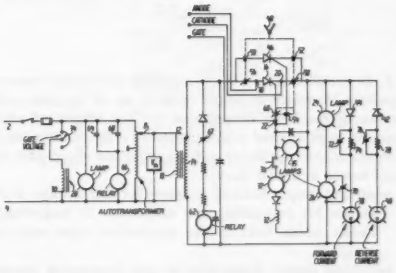
Robbie E. Shelnutt, Rte. 3, Carrollton, Ga. 30117, assignor to Southwire Company, Carrollton, Ga.

Filed Mar. 2, 1973, Ser. No. 337,703

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G01R *31/22, 1/36*

U.S. Cl. 324—158 D **4 Claims**



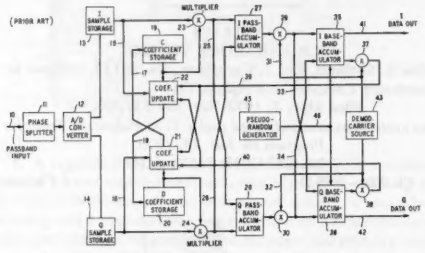
1. An apparatus for testing SCRs and diodes comprising:
   a. alternating-current power supply means for supplying selectively rated anode-cathode a.c. voltages to a diode or an SCR sought to be tested;
   b. control voltage supply means for supplying selectively a rated control voltage to the gate electrode of an SCR sought to be tested, said control voltage supply means and said power supply means being independently variable;
   c. an SCR having known characteristics;
   d. connection means including switch means having (1) a first position for connecting, via a given circuit within the apparatus, said alternating-current power supply means to the anode-cathode circuit of said SCR having known characteristics and for connecting said control voltage supply means to its gate electrode, and having (2) a second position for connecting, via said given circuit within the apparatus, said power supply means to the anode-cathode circuit of a diode or an SCR sought to be tested;
   e. first indicator means coupled to said switch means for indicating whether the diode or SCR sought to be tested operates properly in response to said rated voltages when said switch means is in said second position;
   f. second indicator means coupled to said switch means for indicating whether the diode or SCR sought to be tested is forwardly or reversely biased, when said switch means is in said second position, said first indicator means and said second indicator means indicating whether the apparatus is properly operating when said switch means is in its first position; and

g. overload protection means for protecting said first and second indicator means when said power supply means supplies a voltage above a given level by connecting additional impedance in series with said first and second indicator means whereby said apparatus continues to operate in a normal fashion.

3,914,691
REPOSITIONING OF EQUALIZER TAP-GAIN COEFFICIENTS

Howard Clarence Meadors, Jr., Wayside, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 21, 1974, Ser. No. 499,123
Int. Cl.² H04B *1/00*
U.S. Cl. 325—42 **5 Claims**



1. In combination with a multitap automatic transversal equalizer for which an initial ordered set of tap-gain coefficient words has been determined but the largest of which is required to be aligned with a preferred reference tap location, a multiword storage medium for a sequence of tap-gain coefficient words in digital form,

input and output holding registers for said storage medium, means for comparing the difference in magnitude between words held in the respective input and output registers,

switching means responsive to said comparing means for directing the contents of either the output or input registers into the input register in accordance with the larger magnitude thereof,

means for sequentially transferring the coefficient words into said output register until all such coefficient words have circulated therethrough for comparison with the contents of said input register to determine the largest such coefficient word, and

means for shifting all said coefficient words through said multiword medium by a predetermined amount such that said largest coefficient word is stored in a position corresponding to the preferred reference location of said equalizer.

3,914,692
EMERGENCY COMMUNICATION SYSTEM

George C. Seaborn, Jr., 928 Warfield, Richardson, Tex. 75080

Filed Aug. 29, 1973, Ser. No. 392,498
Int. Cl.² H04B *1/00*; H01B *1/38*; H04B *1/034*; G08B *1/08*
U.S. Cl. 325—53 **2 Claims**

1. An emergency communication system comprising:

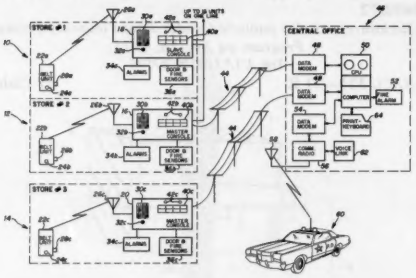
a portable unit for being carried by a wearer,

an alarm in said unit and having an alarm switch for being activated by the wearer to transmit alarm radio waves to a remote location,

a console at said remote location for receiving said alarm radio waves and for transmitting a request for assistance signal to a central office and acknowledge radio waves to said portable unit indicating that assistance has been summoned,

a first switch on said console which cancels the transmission of the request for assistance signal if said first switch is actuated by the wearer within a predetermined time period after actuation of said alarm,

means in said portable unit for receiving said acknowledge radio waves and for physically notifying the wearer that



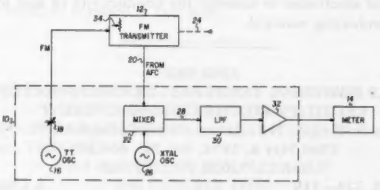
said predetermined time period has expired without said first switch being actuated and that assistance has been summoned, and

a second switch on said console for preventing transmission of additional request for assistance signals if said second switch is actuated within a predetermined interval after assistance has arrived.

3,914,693
CALIBRATION TEST APPARATUS

Gilbert M. Ohlen, Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed July 10, 1974, Ser. No. 487,097
Int. Cl.² H04B *1/02*
U.S. Cl. 325—134 **2 Claims**



1. The method of calibrating a frequency deviation adjustable frequency modulated transmitter for frequency deviation when the transmitter includes output means for providing an automatic frequency control (AFC) test signal directly indicative in frequency of the carrier frequency of the signal to be transmitted comprising the steps of:

generating a first signal of a predetermined amplitude and a first frequency;

applying the first signal to the frequency modulated transmitter for frequency modulating the carrier output thereof;

generating a second signal of a second frequency, the frequency of said second signal differing from the frequency of the AFC test signal by a lessor amount than said first frequency;

mixing the test signal and said second signal;

lowpass filtering the mixed test and second signals to pass only the difference frequency signal;

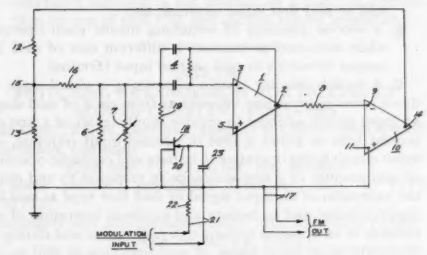
measuring the amplitude of the signal passed by filtering; and

adjusting the frequency deviation of said transmitter until a first minimum amplitude measurement is obtained at which point the transmitter deviation is calibrated.

3,914,694
FREQUENCY MODULATION CIRCUIT

Elbert N. Shawhan, West Chester, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Sept. 12, 1973, Ser. No. 396,628
Int. Cl.² H04B *1/04*
U.S. Cl. 325—145 **6 Claims**

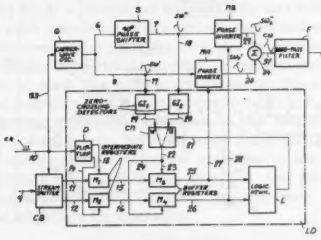


1. A frequency modulation circuit comprising: differential amplifier means having first and second inputs and an output, a filter having an input and an output, said output being connected to the first input of the amplifier means and said filter being tuned to a predetermined carrier frequency, resistor means connected to the input of the filter for manually tuning the frequency of the filter, feedback loop means connecting the output of the amplifier means to the input of the filter and including a voltage divider, a modulation input, a modulation-voltage-responsive continuously variable impedance connected to the modulation input, the second input of said amplifier means, and the input of said said filter to vary the tuning thereof, and frequency-modulated-wave output connections coupled to the filter output.

3,914,695
DATA TRANSMISSION WITH DUAL PSK MODULATION

Pietro Porzio Giusto, Turin, Italy, assignor to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy

Filed July 10, 1974, Ser. No. 486,999
Claims priority, application Italy, July 12, 1973, 69081/73
Int. Cl.² H04B *1/04*
U.S. Cl. 325—145 **10 Claims**



1. A system for transmitting information contained in a bit stream having a cadence *f*, comprising:

conversion means for deriving from said bit stream a pair of pulse sequences of pulse width $2/f$ composed of lengthened alternate bits of said bit stream;

a source of two sine waves, of a frequency at least equal to half the reciprocal of said pulse width $2/f$, in quadrature with each other;

a pair of phase inverters for said sine waves respectively responsive to said square waves for translating amplitude changes of said pulse sequences into 180° phase shifts of said sine waves;

pulse-generating means for producing two interleaved trains of trigger pulses respectively coinciding with the zero crossings of said sine waves;

delay means connected to said conversion means for preventing the transmission of said amplitude changes to said phase inverters until the arrival of a trigger pulse;

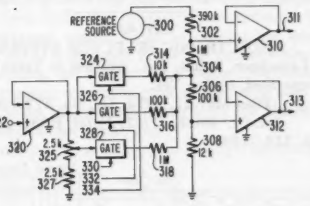
discriminating means responsive to the relative amplitudes of said pulse sequences for controlling the transmission of said trigger pulses to said delay means to reverse the phase of a sine wave in trailing position only at a peak thereof and of a sine wave in leading position only at a zero crossing thereof; and

circuit means of limited bandwidth connected to said source downstream of said phase inverters for synthesizing a phase-modulated carrier from the combined sine waves.

3,914,696
CONTROLLABLE REFERENCE SUPPLY FOR TELEVISION TUNERS

Wayne Wheeler Evans, Carmel, Ind., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 18, 1974, Ser. No. 434,407
Int. Cl.² H03J *5/24*; H04B *1/16*
U.S. Cl. 325—422 **12 Claims**



1. In a television receiver having a voltage controlled tuner, a tuning voltage supply arrangement comprising:

a reference voltage supply;

a plurality of series connected resistor elements coupled to said reference voltage supply;

a first output means coupled to a first junction of said series connected resistor elements for providing a first controllable reference output voltage;

a second output means coupled to a second junction of said series connected resistor elements for providing a second controllable reference output voltage different from said first output voltage;

a source of automatic fine tuning correction voltage; and

means coupling said source of automatic fine tuning voltage to a third junction of said series-connected resistor elements for modifying said first and second output voltages with different voltage contributions from said automatic fine tuning voltage such that said first output means receives a greater automatic fine tuning voltage than said second output means.

3,914,697
PFN REGULATOR

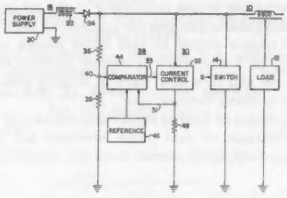
Howard S. Feldmesser, Columbia, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 176,190, Aug. 30, 1971, abandoned. This application Nov. 15, 1975, Ser. No. 524,293
Int. Cl.² H03K *1/14*, *1/02*
U.S. Cl. 328—67 **4 Claims**

1. Pulse forming network regulation circuitry comprising:

A. a pulse forming network operable to store energy and provide said energy as a discharge pulse to a load circuit upon application of a firing signal at a time of firing;

B. means for charging said pulse forming network to an initial voltage level subject to deviation from one pulse time to another;



C. a D.C. reference potential;

D. means for generating an error signal indicative of the difference between said reference potential and PFN voltage; and

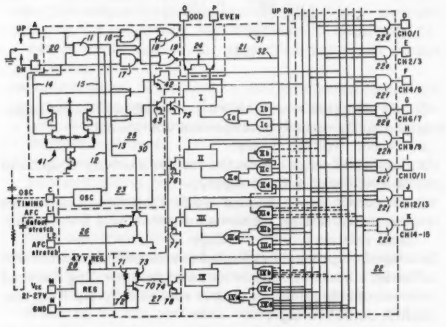
E. means responsive to said error signal for regulating the voltage of said pulse forming network down to a desired operating voltage level and maintaining the pulse forming network voltage substantially at said desired operating voltage level regardless of said time of firing.

3,914,698

ELECTRONIC SELECTOR SYSTEM

Horst Leuschner, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 22, 1974, Ser. No. 472,329
Int. Cl.² H03K *17/02*, *21/00*; H03J *1/00*
U.S. Cl. 328—105 **10 Claims**



1. A selector system for selectively energizing one of 2^n utilization devices comprising:

a. first and second input terminals;

b. a pair of output terminals;

c. 2^{n-1} additional output terminals;

d. means operative in response to and during the application of an input signal of a first logic level to one of said first and second input terminals to produce a signal of a second logic level at said pair of output terminals one at a time at a first predetermined frequency and to produce a signal of said second logic level at said 2^{n-1} output terminals one at a time at a second predetermined frequency different from but related to said first frequency in a first sequence when said input signal is applied to said first input terminal and in a reverse sequence when said input signal is applied to said second input terminal;

e. means operative in response to the application of an input signal of said second logic level to one of said input terminals to produce a signal of said second logic level at one of said pair of output terminals when said input signal of said second logic level is applied to said first input terminal and to produce a signal of said second logic level at the other of said pair of output terminals when said input signal of a second logic level is applied to said second input terminal;

f. a plurality of switching means each operative when activated to connect a different one of said 2^{n-1} output terminals to said first input terminal; and

g. a second plurality of switching means each operative when activated to connect a different one of said 2^{n-1} output terminals to said second input terminal.

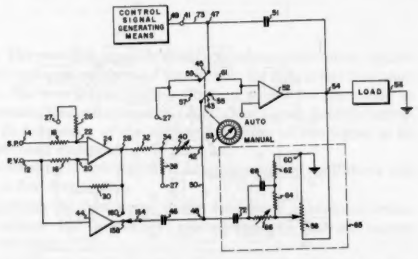
9. A switch selector system comprising a plural stage up-down counter providing bit outputs from each of said stages, an input circuit adapted to receive input signals of a first or a second type at either a first or second input terminal, said input circuit being operative to initiate and continue operation of said counter in a first sequence in response to and during the reception of an input signal of said first type at said first input terminal and to initiate and continue operation of said counter in an opposite sequence in response to and during the reception of an input signal of said first type at said second input terminal, a pair of output terminals receiving opposite logic level signals in dependence on the state of one stage of said counter, a plurality of additional output terminals receiving alternately in sequence opposite logic level signals, one of said logic level signals being received exclusively by each of said additional output terminals in sequence and in dependence on the state of the others of said counter stages, a plurality of normally open switching means each adapted to have two closed states and to connect different ones of said additional output terminals to said first input terminal when in a first closed state and to connect different ones of said additional output terminals to said second input terminal when in said second closed state.

3,914,699

PROCESS CONTROLLER HAVING ELECTRONIC MANUAL CONTROL

James A. Hogan, Hatfield, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 305,068, Nov. 9, 1972. This application Dec. 13, 1973, Ser. No. 424,620
Int. Cl.² H03B *1/04*
U.S. Cl. 328—127 **3 Claims**



1. Control signal generating means comprising:

source terminal means arranged for connection to a voltage source;

a selectively actuable switching means arranged to be selectively connected to said source terminal means; and

responsive means connected to said selectively actuable switching means, said responsive means being responsive to an actuation of said switching means for providing an output signal, said responsive means further including means for characterizing the rate of change of said output signal as a function of the uninterrupted time during

which said switching means remains actuated said source terminal means comprising first and second source terminals arranged for connection to first and second D.C. potentials, respectively, said switching means being selectively operable to engage one of said first and second source terminals, said responsive means further including a reference terminal arranged for connection to a D.C. potential intermediate said first and second D.C. potentials, said switching means being biased to engage said reference terminal in the absence of a selective connection to one of said first and second source terminals.

3,914,700

SWITCHING ARRANGEMENT FOR PICKING UP STORED CONSTANT VOLTAGES

Olaf Allner, Berlin, Germany, assignor to Loewe-Optal GmbH, Kronach, Germany

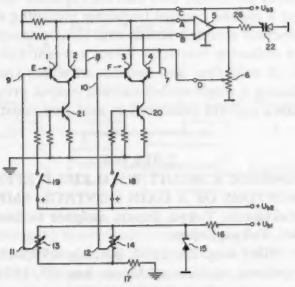
Filed Apr. 17, 1973, Ser. No. 351,863

Claims priority, application Germany, May 4, 1972, 2221773

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03B *3/04;* **H03J** *3/04, 5/02*

U.S. Cl. 328—141 **5 Claims**



1. In a circuit arrangement for recalling stored constant DC voltages for tuning a circuit via a capacitance-diode wherein the tuning voltages for the capacitance diode are adapted to be picked off by means of a plurality of an adjustable voltage storers, the improvement which comprises, in combination, a common differential amplifier whose output is coupled to the capacitance diode a plurality of adjustable further differential amplifiers each associated with a voltage storer and operable when conditioned for exciting the common differential amplifier, each further differential amplifier having first and second inputs and at least one output connected to the common differential amplifier, first means for connecting the first input of each further differential amplifier to the output of the associated voltage storer, second means for connecting the output of the common differential amplifier to the second input of each further differential amplifier, and means for independently conditioning each of the respective further differential amplifiers for operation.

3,914,701

INDICATOR APPARATUS FOR DEVELOPING OUTPUT INDICATIONS INDICATIVE OF INPUT SIGNALS

Neal M. Burdick, 1442 NW. 45th, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 294,380, Oct. 2, 1972, Pat. No. 3,818,341. This application Dec. 3, 1973, Ser. No. 421,025

Int. Cl.² H03K *5/20*

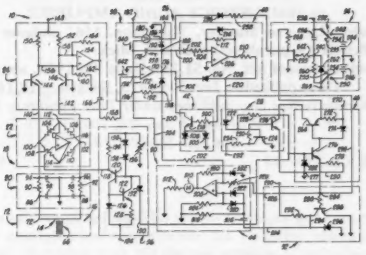
U.S. Cl. 328—151 **13 Claims**

1. Apparatus for developing a signal indicative of an input signal, comprising:

means developing a first signal having a predetermined amplitude;

means receiving the first signal and the input signal, and integrating the difference between the input signal and the first signal thereby producing an integrated output signal;

means receiving the integrated output signal and developing a sample signal indicative of the amplitude of the input signal at a predetermined minimum level of the integrated output signal;



means clamping the integrated output signal at a predetermined level below the predetermined minimum level of the integrated output signal to prevent the integrated output signal from going below the predetermined level for clamping, the sample signal being developed at the predetermined minimum level of the integrated output signal above the predetermined level for clamping the integrated output signal; and

means receiving the sample signal having a portion holding the sample signal.

3,914,702

COMPLEMENTARY FIELD-EFFECT TRANSISTOR AMPLIFIER

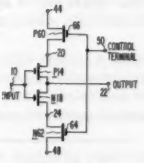
William Frederick Gehweiler, Moorestown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed June 1, 1973, Ser. No. 365,834

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03F *3/18*

U.S. Cl. 330—13 **18 Claims**



13. The combination of:

a complementary symmetry field-effect transistor amplifier comprising a P-type transistor, a N-type transistor, each transistor having a conduction path and a control electrode for controlling the conductance of said path, said two paths connected in series between first and second operating voltage terminals, an output terminal at the connection of said two paths, and an input terminal insulated from said output terminal and connected to both control electrodes;

means coupled to said input terminal for quiescently biasing said amplifier at an operating point at which both transistors conduct;

terminals for a voltage source; and

means coupled to said terminals for said voltage source and to said output terminal and responsive to the output voltage at said output terminal for controlling the operating voltages applied to said first and second terminals to values to stabilize the operation of said amplifier at said operating point.

3,914,703

HALF-BRIDGE AUDIO AMPLIFIER

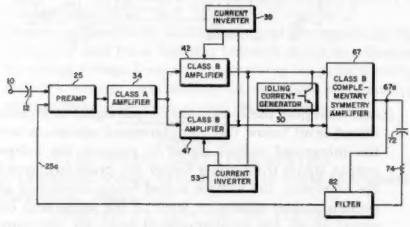
Reuben Laverne Stauffer, Timonium, Md., assignor to The Bendix Corporation, Southfield, Mich.

Continuation of Ser. No. 51,259, June 30, 1970, abandoned. This application Jan. 31, 1973, Ser. No. 328,164

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03F *3/18*

U.S. Cl. 330—17 **9 Claims**



1. Means for amplifying an input frequency signal including an output terminal on which the amplified frequency signal appears comprising:

a voltage source;

a complementary symmetry transistor amplifier including a first transistor and a second transistor of opposite polarity having commonly connected collector electrodes comprising said output terminal, emitter electrodes connected across said voltage source, and first and second control electrode means;

transfer amplifier means for applying said input frequency signal to said first and second control electrode means of said first and second transistors;

means for supplying quiescent current to said transfer amplifier means whereby said quiescent current flows in said transfer amplifier means and is applied to said first and second control electrode means of said first and second transistors;

means for generating a second current equal to said quiescent current and for applying said second current to said first and second control electrode means in a direction to cancel said supplied quiescent current therefrom.

3,914,704

FEEDBACK AMPLIFIER

Jack Craft, Somerville, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 17, 1974, Ser. No. 470,758

Claims priority, application United Kingdom, Aug. 13, 1973, 38320/73

Int. Cl.² H03F *3/42*

U.S. Cl. 330—18 **8 Claims**

1. A feedback stabilized amplifier comprising:

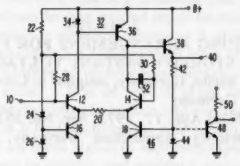
a differential signal amplifier having at least first and second signal amplifier transistors and a signal input terminal coupled to one of said transistors,

a first current control transistor coupled to said differential signal amplifier for supplying bias current to said first and second amplifier transistors,

a single-ended output terminal direct current coupled to said differential amplifier,

a first resistance having a first terminal direct current coupled to said output terminal and further having a second terminal, and

current repeater means exclusive of said first current control transistor for providing negative feedback to said



amplifier, said current repeater means being directly connected to said second terminal with at least one semiconductor junction direct current coupled between said second terminal of said first resistance and a point of reference potential, said current repeater means further having a second control transistor including a base-emitter junction coupled across said semiconductor junction and a collector electrode direct current coupled to the other of said first and second amplifier transistors for producing a single-ended current output proportional to feedback current produced in said first resistance.

3,914,705

CONTROL CIRCUIT WITH FIELD EFFECT TRANSISTORS OF A GAIN CONTROL AMPLIFIER

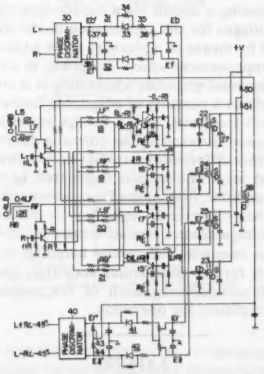
Susumu Takahashi, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Aug. 23, 1974, Ser. No. 499,945

Claims priority, application Japan, Aug. 27, 1973, 48-95903

Int. Cl.² H03G *3/30*

U.S. Cl. 330—29 **7 Claims**



1. A gain control circuit for a gain control amplifier comprising a control field effect transistor having source, drain and gate and operatively coupled to the gain control amplifier to control the gain thereof in accordance with the resistance variation between the source and drain of said control field effect transistor; and control voltage generating means for generating a control voltage signal whose voltage level varies relative to a reference voltage, the gate of said control field

effect transistor being connected to receive the control voltage signal, characterized in that

said control field effect transistor consists of a first of a plurality of field effect transistors formed in a semiconductor chip, the source-drain path of said first field effect transistor being AC coupled to said gain control amplifier so that no DC current flows through the drain-source path of said first field effect transistor, and

a second field effect transistor formed in said semiconductor chip is connected in source follower configuration to a power source so that a predetermined amount of DC current flows through the drain-source path of said second field effect transistor,

the source of said second field effect transistor being DC coupled to the source of said first field effect transistor, and the gate of said second field effect transistor being coupled to the reference voltage.

3,914,706

FREQUENCY ADJUSTMENT OF TIMEKEEPERS

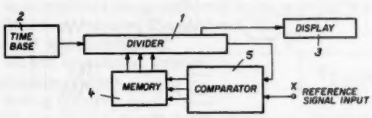
Walter Hammer, Boudry, and Eric Andre Vittoz, Cernier, both of Switzerland, assignors to Centre Electronique Horloger, S.A., Neuchatel, Switzerland

Continuation of Ser. No. 297,074, Oct. 12, 1972. This application Sept. 3, 1974, Ser. No. 502,990

Claims priority, application Switzerland, Oct. 15, 1971, 15118/70

Int. Cl.² H03B *3/04*

U.S. Cl. 331—1 A **5 Claims**



1. A timekeeping instrument comprising a time base oscillator, an adjustable frequency divider connected to the output of said oscillator, means coupled to said divider for comparing the frequency to be adjusted of the divider output signal with a reference frequency of a standard signal, means coupled to said comparing means for computing as a function of the measured difference the value of the division ratio necessary for the divider output frequency to be equal to the reference frequency, an alterable memory coupled to said computing means for storing the output thereof, and means coupled between said memory and said divider for setting the division ratio of said divider at said computed value.

3,914,707

SYSTEM FOR SYNCHRONIZING A FREELY OSCILLATING OSCILLATOR TO A REFERENCE OSCILLATION

Wilhelm Amend, Baierbrunn, Buchenhain, and Toma Sotirovic, Munich, both of Germany, assignors to Siemens Aktiengesellschaft, Germany

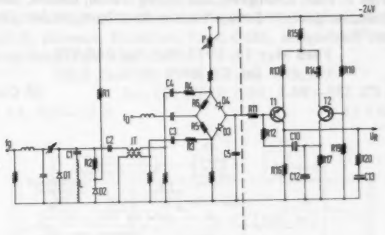
Filed July 16, 1974, Ser. No. 488,985

Claims priority, application Germany, July 16, 1973, 2336140

Int. Cl.² H03B *3/04*

U.S. Cl. 331—4 **6 Claims**

1. The combination of a free-running oscillator having a control input for frequency adjustment, a reference oscillator, a discriminator for comparing the phase of the free-running oscillator to the phase of the reference oscillator, an amplifier coupled to an output of the discriminator and supplying a control signal to the control input of the free-running oscillator for locking said oscillator to said reference oscillator, means for developing pulses from the reference oscillator frequency and said discriminator comprising switch means controlled by said pulses for switching the free-running oscillator output signal for approximately one half of its time period and for producing a positive or negative d.c.-signal output depending upon the phase difference between said pulses and said free-running oscillator output frequency and wherein said amplifier has a regenerative ac feedback circuit having its parameters chosen to develop a damped oscillation after said amplifier receives a signal from said discriminator indicating a lack of synchronization between said two oscillators and



wherein said amplifier has two transistor stages in a common emitter configuration and wherein the collector resistances are relatively higher than the emitter resistances and wherein the control signal for the free-running oscillator is taken from the collector of the first transistor stage and wherein the ac feedback circuit is a series resistance-capacitance branch connected from the output of the second stage to the input of the first stage.

3,914,708

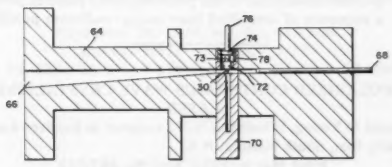
BI-STATE VARACTOR PHASE MODULATION NETWORK AND PROCESS FOR CONSTRUCTING SAME

Harry L. Stover, Newbury Park, and Hayden M. Leedy, Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation of Ser. No. 305,049, Nov. 9, 1972, abandoned. This application Jan. 14, 1974, Ser. No. 432,923

Int. Cl.² H03C *3/22;* **H03H** *7/30;* **H03K** *17/74*

U.S. Cl. 332—30 V **9 Claims**



1. A low distortion high frequency phase modulation network for introducing a phase change into microwave or millimeter wave signals and having a bistate frequency switching capability at least in excess of approximately 100 gigahertz comprising:

a. conductive means including input and output ports for receiving said signals and for propagating reflected signals,

b. a terminating impedance or short connected across said input and output ports,

c. a bistate varactor diode connected in parallel with said terminating impedance or short and spaced therefrom an adjustable phase difference θ, and

d. means for biasing said varactor diode at one or another of its two relatively stable capacitance states, whereby said varactor diode will either approximate a series resonant condition or an antiresonant condition and thereby cause a predetermined phase delay in signals reflected on said conductive means in accordance with the resonant

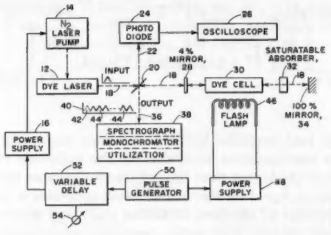
state of said varactor diode, whereby said varactor diode may be rapidly switched between said capacitance states at frequencies up to and including 100 gigahertz or higher.

3,914,709

APPARATUS FOR LENGTHENING LASER OUTPUT PULSE DURATION

Charles T. Pike, Lexington, and Irving Itzken, Boston, both of Mass., assignors to Jersey Nuclear-Avco Isotopes, Inc., Bellevue, Wash.

Filed May 14, 1973, Ser. No. 360,178
Int. Cl. H01S *3/10*
U.S. Cl. 331—94.5 **25 Claims**



1. A system for lengthening the duration of laser pulse radiation comprising:

means for generating a laser radiation pulse;

a laser radiation pulse amplifier for the generated pulse and including means for exciting the laser amplifier to an amplifying condition;

the generated pulse from said generating means being directed to said laser amplifier to provide amplified laser radiation as the amplified pulse generated from said laser generating means;

means for reapplying a predetermined portion of said amplified laser radiation to said laser amplifier; and

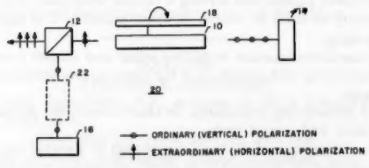
means for timing the reapplication of said predetermined portion subsequent to the prior amplified pulse to provide a sequence of amplified laser output radiation pulses.

3,914,710

POLARIZED CONTINUOUS WAVE CRYSTALLINE LASER

Donald S. Young, Windham, N.H., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed May 6, 1974, Ser. No. 467,352
Int. Cl.² H01S *3/05, 3/086*
U.S. Cl. 331—94.5 C **7 Claims**



1. A laser for the generation of CW plane polarized radiation comprising:

a. a crystalline laser rod,

b. a beam splitting polarizer,

c. a pair of highly reflective mirrors,

d. said laser rod and said beam splitting polarizer being bounded by said mirrors and in optical alignment therewith forming a laser cavity therebetween,

e. pumping means for continually pumping said laser rod causing thermally induced stress birefringence in said laser rod to perform a polarization rotation whereby polarized radiation is coupled from said cavity via said beam splitting polarizer, and

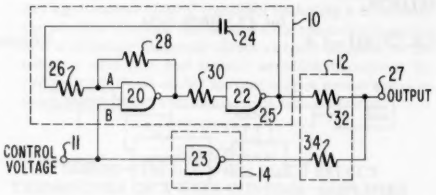
f. means for rotating said laser rod and pumping means with respect to said beam splitting polarizer for controlling the output of polarized radiation from said beam splitting polarizer.

3,914,711

GATED OSCILLATOR HAVING CONSTANT AVERAGE D.C. OUTPUT VOLTAGE DURING ON AND OFF TIMES

Curtis Raymond Carlson, Rocky Hill; Istvan Gorog, Princeton, and Philip Michael Heyman, Trenton, all of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Feb. 25, 1974, Ser. No. 445,471
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H03K *1/14*
U.S. Cl. 331—108 D **5 Claims**



1. In combination:

an oscillator;

means for applying a control voltage to the oscillator for causing the latter to produce oscillations at an average d.c. voltage level other than a reference voltage level;

a summing circuit to which said oscillations are applied; and

means responsive to said control voltage when it is at a level to terminate said oscillations for applying to said summing circuit a voltage at a level such that it causes the summing circuit to produce a d.c. voltage level in the absence of said oscillations which is equal to that it produces during the presence of said oscillations.

5. In combination:

a logic gate oscillator comprising a first logic gate having an input terminal to which a control voltage may be applied for priming that gate and having also a feedback loop including a binary inverter connected between the output terminal of said logic gate and a second input terminal of that logic gate, the output terminal of said oscillator being coupled to the output terminal of said inverter, whereby when said oscillator is turned on, the oscillations at said output terminal are at an average d.c. voltage level other than a reference voltage level;

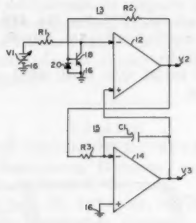
a second binary inverter similar to the said first inverter and receptive of said control voltage, said second inverter producing an output voltage level other than said reference voltage level when said control voltage is at a value to turn said oscillator off; and

a summming network receptive of the output of both inverters for producing, in response to said oscillations, an average d.c. voltage level at its output terminal of a given value, and for producing, in response to the output of said second inverter and the absence of said oscillations, at the summing network output terminal a d.c. voltage level of the same value as produced during said oscillations.

3,914,712
VOLTAGE CONTROLLED OSCILLATOR HAVING FREQUENCY VARYING INVERSELY WITH CONTROL VOLTAGE

James R. Currie, Huntsville, Ala., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration Office of General Counsel - Code GP, Washington, D.C.

Filed Sept. 30, 1974, Ser. No. 510,679
Int. Cl.² H03K *1/16, 3/02*
U.S. Cl. 331—111 **4 Claims**

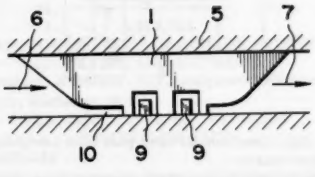


1. A voltage controlled oscillator comprising:
a first stage comprising:
a first operational amplifier and a clamping transistor, the output of said first operational amplifier being connected to the input of said transistor, and the output of said transistor being connected to the inverting input of said first operational amplifier;
a second stage comprising:
a second operational amplifier,
integrating means,
a timing resistor,
said integrating means being connected between the output of said second operational amplifier and the inverting input of said second operational amplifier, said timing resistor being connected between the output of said first operational amplifier and the inverting input of said second operational amplifier, and
the output of said second operational amplifier being connected to the non-inverting input of said first operational amplifier; and
means for connecting a control voltage to the inverting input of said first operational amplifier.

3,914,713
MICROWAVE CIRCUITS CONSTRUCTED INSIDE A WAVEGUIDE

Yoshihiro Konishi, Sagamihara; Kenichi Konno, Machida; Norihiko Yazawa, Kawasaki, and Norio Hoshino, Tokyo, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo, Japan

Filed May 18, 1973, Ser. No. 361,817
Claims priority, application Japan, May 23, 1972, 47-50993
Int. Cl.² H01P *5/08, 1/20, 3/12*
U.S. Cl. 333—21 R **6 Claims**

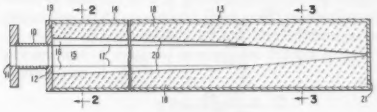


1. A microwave circuit comprising a waveguide, and a single conductive flat member ending with an uninterrupted edge, and arranged inside said waveguide in parallel with the E-plane to form a cut-off region, said single flat member including a plurality of planar circuit elements wherein a plurality of said circuit elements form a band pass filter both by coupling said circuit elements between each other and by coupling between said circuit elements and a transmission region of the waveguide, the circuit elements coupled to the transmission region of the waveguide comprising image-type slot lines.

3,914,714
HIGH POWER DRY LOAD IN GROOVED WAVEGUIDE

Floyd O. Johnson, Mountain View, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed June 14, 1974, Ser. No. 479,327
Int. Cl.² H01P *1/26*
U.S. Cl. 333—22 R **11 Claims**

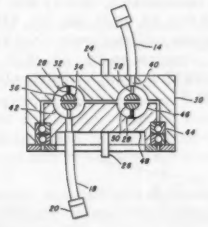


1. A waveguide power absorber comprising:
a length of enclosed waveguide;
a wave attenuating member within said waveguide extending generally in the direction of wave propagation; said waveguide being so shaped in cross section transverse to the direction of propagation as to include a region in which, as a function of transverse distance from the locus of maximum electric field, the electric field decreases at a decreasing rate, and a first end of said attenuating member nearest the source of wave energy is entirely located in said region; said region being a slot of width less than one-half of a free space wavelength in the band of interest, said slot being symmetrical about a midplane of said waveguide.

3,914,715
COAXIAL RING ROTARY JOINT

James H. Hubing, and Gerald H. Mongold, both of Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed June 26, 1974, Ser. No. 483,166
Int. Cl.² H01P *1/06, 3/08, 5/12*
U.S. Cl. 333—24 R **20 Claims**



1. A rotary joint for supplying RF energy through a system having a stationary member and a rotating member comprising:
a. an RF energy input feed line means coupled to a source of RF energy;
b. a rotary joint means, said rotary joint means including a split coaxial, ring-shaped cable means having a stator half electrically coupled to the stationary member through the input feed line means, and a rotor half electrically coupled to the rotating member; and

c. an RF energy output collecting means operatively coupled to the rotor half for collecting the RF energy passing through the split coaxial, ring-shaped cable means.

3,914,716

TONE CONTROL CIRCUIT

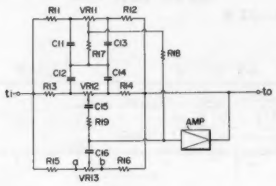
Hirotaka Kurata, Tokyo, Japan, assignor to Sansui Electric Co., Ltd., Tokyo, Japan

Filed Oct. 21, 1974, Ser. No. 516,288

Claims priority, application Japan, Oct. 26, 1973, 48-124174

Int. Cl.² H03G 5/12

U.S. Cl. 333—28 T **3 Claims**



1. A tone control circuit, wherein low-, middle- and high-frequency tone-controlling variable resistors are each connected at one end to the input terminal of said control circuit and at the other end to the output terminal of said control circuit; the low-frequency tone-controlling variable resistor has a sliding member which is connected through a first resistor to the input terminal of an amplifier whose output terminal is connected to the output terminal of said control circuit and which sliding member is also connected to one terminal of a second resistor, the opposite terminal of which is connected to both terminals of the middle-frequency tone-controlling variable resistor through first and second capacitors respectively; the sliding member of said middle-frequency tone-controlling variable resistor is connected to the input terminal of the amplifier through a third capacitor and a third resistor; and the sliding member of the high-frequency tone-controlling variable resistor is connected to the input terminal of the amplifier through a fourth capacitor.

3,914,717

SURFACE WAVE TUBULAR ACOUSTIC DELAY LINE

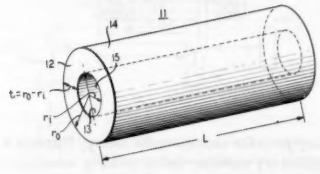
Robert L. Rosenberg, Fair Haven, and Ronald Vernon Schmidt, Matawan, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 26, 1973, Ser. No. 410,168

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03H 9/26, 9/30; H01L 41/04, 41/10

U.S. Cl. 333—30 R **16 Claims**



1. An acoustic delay line for providing a substantially constant delay to an applied signal having a frequency band Δf comprising:

an elastic member having outer and inner closed surfaces of finite length, said inner surface defining an orifice extending through said member and providing a means for guiding said signal through said member via an acoustic surface wave which propagates on said inner surface along the length thereof, said outer surface being sufficiently far removed from said inner surface so as to prevent any substantial transfer of said surface wave to said outer surface during propagation of said wave along the length of said inner surface.

3,914,718

LONG-DELAY ELECTROACOUSTIC LINE

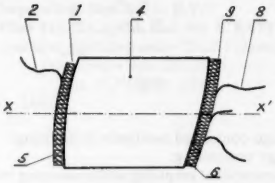
Jean Puyhaubert, and Michel Seguin, both of Paris, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

Filed July 16, 1974, Ser. No. 489,057

Claims priority, application France, July 30, 1973, 73.27744, Aug. 14, 1973, 73.29619

Int. Cl.² H03H 9/26, 9/30; H01L 41/10

U.S. Cl. 333—30 R **6 Claims**



1. A multi-reflection electroacoustic delay line comprising:

a. an acoustic propagation medium of generally cylindrical shape terminated by two end faces for propagating the acoustic wave therebetween;

b. at least one transducer for launching acoustic energy into said medium; and

c. at least one of said end faces having a symmetry axis cutting the longitudinal symmetry axis of said cylindrically shaped medium and at least one reflecting and focusing face provided on the surface of said medium.

3,914,719

BAND-PASS FILTER AND METHOD OF MAKING SAME

Max Hetzel, Bienne, Switzerland, assignor to Elresor SA, Bienne, Switzerland

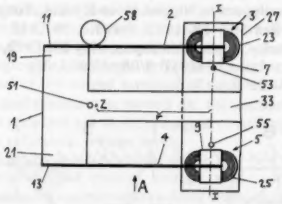
Filed June 4, 1973, Ser. No. 366,589

Claims priority, application Switzerland, June 12, 1972, 8685/72

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² H03H 9/02, 9/26; H02K 35/00

U.S. Cl. 333—71 **27 Claims**



1. An electromechanical band-pass filter comprising:

a support means;

a coupling mass resiliently suspended from said support means;

first and second resonator means each in the form of a leaf spring having one end rigidly fixed to said coupling mass and being provided at its free end with a plate of low

remanence magnetic material to which is attached a pair of permanent magnets arranged with their magnetic axes orthogonal to the plate and to the direction of principal oscillation of said resonators;

each said plate with its magnets constituting the main portion of the mass of each resonator and at the same time comprising a part of an electrodynamic transducer;

a further part of said electrodynamic transducer being comprised in each case of a plate of low remanence magnetic material fixed to the coupling mass so as to form a part thereof and bearing thereon a coil having its axis parallel to the magnetic axes of said permanent magnets;

said coils and said permanent magnets being separated by an air gap, the arrangement being such that the magnetic lines of force flow in opposite directions through diametrically opposed portions of said coil underlying said permanent magnets.

3,914,720

AUTOMATIC PROTECTIVE CIRCUIT BREAKER

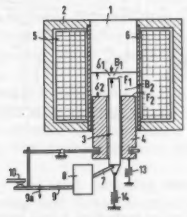
Horst Drubig, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 19, 1974, Ser. No. 507,572

Claims priority, application Germany, Sept. 27, 1973, 2348613

Int. Cl.² H01H *75/10, 77/06*

U.S. Cl. 335—14 **13 Claims**



1. An automatic switch comprising the combination of a latching mechanism having an unlatching lever and a movable contact member which can be actuated by the latching mechanism and a magnetic tripping device comprising,

a first armature mechanically linked to said unlatching lever,

a second armature mechanically linked to said movable contact member,

a magnetic core,

an exciter coil causing magnetic flux to flow between said magnetic core and said first armature across a first air gap and causing magnetic flux to flow between said magnetic core and said second armature across a second air gap, wherein said first armature is placed at least in part in the same magnetic flux path as is said second armature, and magnetic shunt means for magnetically bridging said second air gap at least in part with said magnetic core.

3,914,721

COMBINATION SPECULAR-DIFFUSE PROJECTION DEVICE AND METHOD

John S. Pollock, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

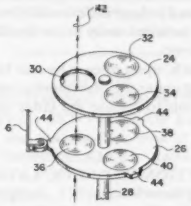
Filed Sept. 3, 1970, Ser. No. 69,386

Int. Cl.² G03B *27/76*

U.S. Cl. 355—35 **6 Claims**

1. A method of shortening the overall projection time while still suppressing defects in a composite print made by projecting first, second and third color separation images onto a photosensitive material which is less responsive to exposure of said first color separation image than to said second and third color separation images, said method comprising in any order, the steps of:

projecting said first color separation image by means of substantially specular illumination onto said photosensitive material to shorten the exposure time of said photo-



senstive material to said first color separation image; and projecting said second and third color separation images by means of substantially diffuse illumination onto said photosensitive material to suppress defects in said composite print.

3,914,722

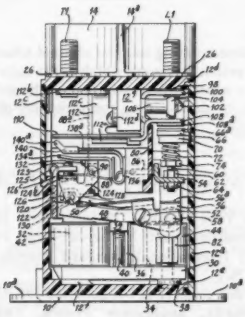
THREE PHASE REMOTE CONTROL CIRCUIT BREAKER

Edward A. Mallonen, New Berlin, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

Division of Ser. No. 409,785, Oct. 26, 1973, Pat. No. 3,863,186. This application Oct. 4, 1974, Ser. No. 512,174

Int. Cl.² H01H *9/20*

U.S. Cl. 335—44 **5 Claims**



1. An electrical circuit breaker for remote control operation, comprising:

a. a plurality of power contact means including pairs of stationary contacts and associated movable contactors;

b. reciprocably movable means operable to close said contactors to said stationary contacts and reopen the same;

c. electromagnetic operating means including a pair of spaced apart coil means and an armature pivotally mounted between and movable from one to another extreme pivotal positions by selective energization of said coil means;

d. a lever pivotally mounted on said armature and having connection adjacent one end with said reciprocably movable means;

e. a pivotally mounted latch catch biased into engagement with said lever adjacent its other end;

f. a pivotally mounted latch biased into latching relation with said latch catch to constrain it and said lever against pivotal movement;

g. bimetal members in circuit with each of said power contact means;

h. means mounted on said latch and comprising portions engageable by said bimetal members when the latter warp under the influence of overload currents to thereby cause pivoting of said latch out of engagement with said latch

catch, and a member having a plurality of spaced apart arms which are in line with respective ones of said bimetal members and a corresponding number of ambient temperature compensator bimetal members secured at corresponding ends to said latch and at their other ends to the last recited member, said compensator bimetal members when subjected to heat differentially tending to pivot said last recited member away from the first mentioned bimetal members;

i. said latch catch, upon release by said latch, and said lever both pivoting under the bias imposed on said reciprocably movable means to release the latter for contact opening movement.

3,914,723

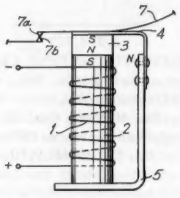
POSITIVE ACTION MAGNETIC LATCHING RELAY

Isaac Goodbar, Queens Village, N.Y., assignor to Edison Price, Inc., New York, N.Y.

Filed July 15, 1974, Ser. No. 488,577

Int. Cl.² H01H *51/22*

U.S. Cl. 335—79 **8 Claims**



5. The positive latching relay of claim 4 wherein the coil is connected to switching means which are in turn adapted to be connected to a source of electric power, the switching means being capable of determining the direction of current flow through the coil.

3,914,724

HORIZONTAL CROSSBAR MULTISWITCH CONTROL DEVICE

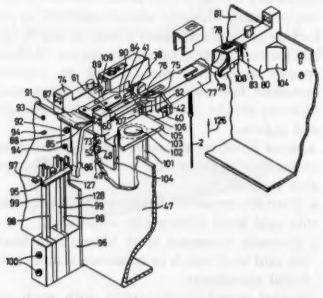
Serge Marcel Yves Maelstaf, Bagneux, and Jacques Joseph Antoine Altesleben, Saint-Michel-sur-Orge, both of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,936

Claims priority, application France, Oct. 18, 1973, 73.37185

Int. Cl.² H01H *67/26*

U.S. Cl. 335—112 **13 Claims**



1. An improved crossbar multiswitch of the type having a horizontal bar rotatably controlled by two electromagnets and two corresponding armatures so that the position of the bar is determined by the action of mechanically controlled switching elements wherein the improvement comprises:

a pair of first and second armature plates movably connected to each of said first and second armatures by means of spring members, said plates positioned proximate each of said armatures and said electromagnets for varying the magnetic gap reluctance therebetween said armatures and said electromagnets; and

a pair of bearing members intermediate said bar and a fixed housing for rotatably supporting said bar.

3,914,725

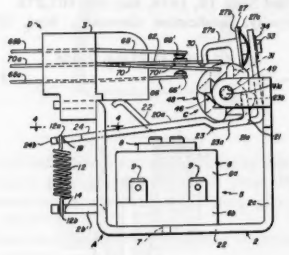
IMPULSE RELAY

Harold L. Williamson, Arlington Heights, Ill., assignor to Littelfuse, Inc., Des Plaines, Ill.

Filed Aug. 30, 1974, Ser. No. 502,038

Int. Cl.² H01H *51/08*

U.S. Cl. 335—140 **10 Claims**

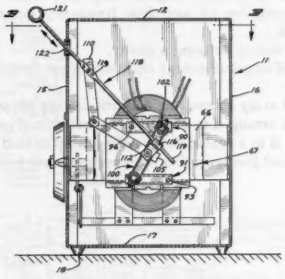


1. An impulse relay including a coil unit, cam follower and contact-carrying arms, an armature spring urged outwardly away from the outer end of the coil unit so upon energization of the coil unit the armature is drawn toward the coil unit against the restraining force of the spring, a cam and ratchet wheel assembly mounted for rotation about a common axis and located outwardly of the coil unit, said armature having portions extending in the space between the cam and ratchet wheel assembly, on the one hand, and said coil unit on the other hand, and terminating in transversely outwardly extending pawl carrying portion, said pawl carrying portion including a pawl-forming extension projecting toward the outer side of said cam and ratchet wheel assembly, said cam and ratchet wheel assembly including cam means and ratchet wheel means, said ratchet wheel means being engaged by said pawl-forming extension when said coil unit is energized, and when said coil unit is energized said cam means being engaged by said cam follower arms to effect opening and/or closing of contacts carried thereby as said cam and ratchet wheel assembly is rotated, said armature also having a transversely outwardly extending locking dog-forming portion which, when the coil unit is de-energized, engages a portion of the cam and ratchet wheel sub-assembly to hold the same against rotation until the pawl is drawn to said coil unit, said pawl-forming extension being formed on a member flexibly secured to said pawl carrying portion of said armature, said member including in addition to said pawl-forming extension an overshoot preventing dog-forming extension projecting towards said cam and ratchet wheel sub-assembly on the outer side thereof, said overshoot preventing the dog-forming extension engaging a portion of said cam and ratchet wheel assembly to stop further rotation thereof after a given amount of rotation is imparted to the ratchet wheel means by said pawl-forming extension upon energization of the coil unit.

3,914,726
QUICK SHUNT LOCKING MEANS

John C. West, St. Paul, and Gary N. Gunderson, Bloomington, both of Minn., assignors to Century Mfg. Co., Minneapolis, Minn.

Filed Jan. 10, 1975, Ser. No. 540,247
Int. Cl.² H01F 21/06
U.S. Cl. 336—133 8 Claims

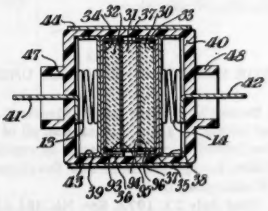


1. A quick shunt locking means for a welding apparatus having a movable shunt, having in combination
a core,
a shunt member movably disposed in said core,
a pair of shunt member holding members carried in said core engaging said shunt member at opposed sides thereof,
a shunt locking means comprising
a yoke member carried at one side of said core engaging one of said pair of shunt holding members,
a stud carried by said core supporting said yoke member, and
means carried by said stud, engaging ramp means on said yoke and moving said yoke member into engagement with said one of said pair of shunt holding members locking said shunt member between said pair of shunt holding members.

3,914,727
POSITIVE-TEMPERATURE-COEFFICIENT-RESISTOR PACKAGE

John H. Fabricius, Stamford, Vt., assignor to Sprague Electric Company, North Adams, Mass.

Filed Jan. 2, 1974, Ser. No. 430,336
Int. Cl.² H01C 7/04
U.S. Cl. 338—22 R 17 Claims

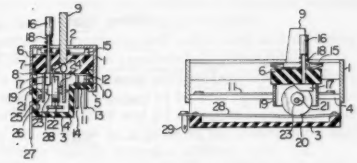


1. A PTCR package comprising
a. a PTCR body comprising at least one PTCR element, said body being cylindrical and having two flat end faces, said body having first and second metal film terminals being on said two end faces, respectively;
b. at least one metal heat conductor cup having a flat bottom, said flat bottom of said one cup being in broad contiguous thermal contact with said first terminal;
c. two electrical leads, each being electrically connected to one of said two terminals, respectively;
d. a housing of an electrically insulating material of cylindrical geometry completely enclosing said PTCR body and said cups, the flange of said at least one cup being in broad contiguous thermal contact with a curved portion of the inner wall of said housing, each said lead extending through another portion of said wall of said housing.

3,914,728
VARIABLE RESISTOR PROVIDED WITH MEANS FOR MEMORIZING A SET VALUE OF RESISTANCE

Matsuo Nishioka, and Shunzo Oka, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed July 9, 1974, Ser. No. 486,756
Claims priority, application Japan, July 9, 1973, 48-77802
Int. Cl.² H01C 10/44
U.S. Cl. 338—119 9 Claims

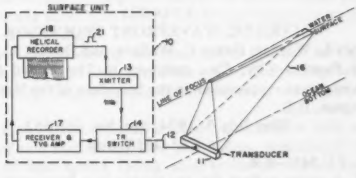


1. A variable resistor provided with means for memorizing a set value of resistance comprising a move means movable over a resistor element of the variable resistor, a roller rotatably mounted on said move means, a contact member provided on the periphery of said roller, and a conductive rail having a length within the movable range of said move means, said conductive rail being always in contact with the periphery of said roller, said contact member and said rail constituting a switch in which said contact member is adpated to be made to come into contact with said rail at any desired position of said move means when said move means in operated to vary the resistance value of the variable resistor.

3,914,729
UNDERWATER ACOUSTIC SURVEILLANCE OF HARBOR AND CHANNEL AREAS

David S. Sims, Ellicott City, Md., and John H. Thompson, Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 3, 1960, Ser. No. 12,652
Int. Cl.² G01S 9/68
U.S. Cl. 340—3 R 3 Claims



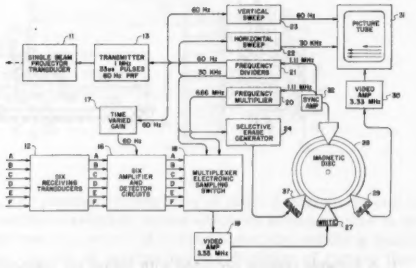
1. A catacoustic system for detecting the intrusion of a body in an object field under a water surface at a harbor entrance or the like comprising a high resolution sonar apparatus in-

cluding a submerged transducer having a vertically oriented fan shape directivity pattern directed at an object field athwart the harbor entrance and having its principal axis slanted towards the water surface, means for periodically pulsing said transducer to radiate pulses, a display medium, and means for receiving flutter echoes of each pulse returned from the water surface and for producing markings at points along a line on said medium varying in position in accord with the range from which said echoes are received, the markings for echoes from successive pulses being produced in line by line correlation, whereby a significant change in the display with time indicates the position of a body intruding in said object field.

3,914,730
MOVING WINDOW SONAR DISPLAY SYSTEM

Charles H. Jones, Murrysville, and Peter N. Wolfe, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 18, 1974, Ser. No. 452,316
Int. Cl.² G01S 9/66, 7/62
U.S. Cl. 340—3 R **9 Claims**



1. A moving window sonar display system comprising a broad beam projective transducer and transmitter means for transmitting a sonar pulse to sonify an area, a plurality (N_B) of line-focus receiving transducers focused on adjacent strips of said area, an amplifier and detector means for and electrically connected to each of said receiving transducers, an electronic sampling switch connected to each of said amplifier and detector means and adapted to sequentially sample the output of each of said means R_E times between successive sonar pulses, a magnetic storage means having at least one track and at least one write head associated with said track and electrically connected to said sampling switch, said storage means adapted to rotate $360°\pm\phi$ between successive sonar pulses and to store the output from said switch as groups of N_B signals at nonadjacent locations between successive pulses and N_B signals of equal R_E from previous and subsequent pulses at adjacent locations thereon, said storage means also including a read head associated with said track electrically connected to a cathode ray display means for transferring said stored signals from said storage means to said display.

3,914,731
ACOUSTIC WAVEFRONT PROCESSOR

Henry L. Warner; Henry C. Wallace, and Donald L. Folds, all of Panama City, Fla., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 3, 1974, Ser. No. 485,662
Int. Cl.² G01S 3/80
U.S. Cl. 340—6 R **3 Claims**

1. A sonar system for processing low frequency acoustic energy signals received through a water medium characterized by a plurality of variable conditions, said system comprising, in combination:

a first array comprising a plurality of receiving transducers arranged in a first predetermined configuration for receiving said low frequency acoustic energy signals and converting them into corresponding low frequency electrical signals;

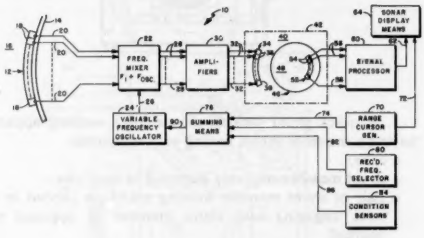
a controllable frequency local oscillator for providing electrical signals of selected frequency;

mixer means for adding said low frequency electrical signals and said local oscillator selected frequency electrical signals to provide higher frequency electrical signals representative of said low frequency acoustic energy signals;

housing means defining a cavity;

a body of acoustic energy conducting gas contained in said cavity;

a second array comprising acoustic energy projecting transducers arranged in a second predetermined configuration which is in a scaled down relationship to said first predetermined configuration, said second array being disposed



in contact with said acoustic energy conducting gas and responsive to said higher frequency acoustic energy signals in said gas;

acoustic lens means, disposed in said gas, for focusing said higher frequency acoustic signals;

a third transducer array comprising receiving transducers for receiving said higher frequency acoustic energy signals focused by said acoustic lens means and converting them to sonar beam related higher frequency electrical signals;

signal processing and display means, connected to said third array, for providing a visual representation of said low frequency acoustic energy signals; and

control means, connected to said controllable frequency local oscillator, for selecting said selected frequency in accordance with at least one of said plurality of variable conditions whereby said focusing of said higher frequency acoustic signals is

adjusted automatically in response to changes in said one of said plurality of conditions.

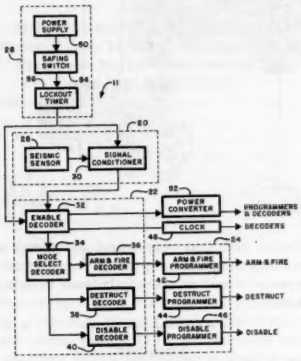
3,914,732
SYSTEM FOR REMOTE CONTROL OF UNDERGROUND DEVICE

Thomas D. Brumleve, Walnut Creek; Mearle G. Hicks, Livermore, and Milton O. Jones, Pleasanton, all of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 23, 1973, Ser. No. 381,632
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² F42D 3/00
U.S. Cl. 340—15 **4 Claims**

1. A system for controlling an action of a nuclear device such as exploding, disabling or destroying a nuclear explosive, contained within a chamber at a remote underground location and isolated from the surface by a column of back filled earth, from different sequences of seismic signal pulses produced at

the surface of the ground comprising a plurality of explosives emplaced in the earth near the surface of the ground and laterally displaced from said column of back filled earth; and means located at the surface for individually detonating said explosives for producing a seismic signal from each detonation in a seismic signal pulse sequence having predetermined pulse sequence characteristics determined by the desired action and for transmitting the same through the earth; and control means located adjacent said nuclear device sensitive to said



seismic signal pulses, including means for producing a corresponding sequence of electrical pulses in response to said sequence of seismic signal pulses; further means for comparing the identity of said electrical pulse sequence with predetermined pulse sequence characteristics determined by the desired action and stored in said further means; and additional means for initiating the desired action of said device in response to receipt of the appropriate pulse sequence characteristics.

3,914,733

SYSTEM INCLUDING A PRESSURE SWITCH FOR COUNTING AXLES AND CLASSIFYING VEHICLES

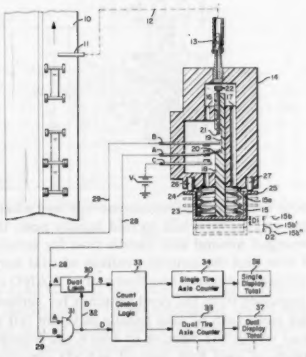
Joseph R. Viracola, P.O. Box 2, Santa Monica, Calif. 90403

Filed Apr. 16, 1973, Ser. No. 351,421

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] G08G *1/015*

U.S. Cl. 340—38 R **10 Claims**



2. A system including a pressure switch for classifying vehicles by providing a first output signal on a first line in response to a single tire axle and a second output signal on a second line in response to a dual tire axle, said system including, in combination:

a. an expandable air chamber means for connection to a hose over which vehicle tires run, said chamber expanding from a normally contracted position to a first distance in response to a pulse of air generated by a single tire axle running over said hose and expanding to a second distance greater than said first distance in response to a pulse of air generated by a dual tire axle running over said hose;

b. a first switch means connected to said first line and coupled to said air chamber means and held in an open position by said air chamber means when in said contracted position, said first switch means being released by said air chamber means to close when said air chamber means expands to said first distance to provide said first output signal; and,

c. a second switch means connected to said second line and coupled to said air chamber means, said second switch means being normally opened, said air chamber means positively closing said second switch means when it expands to said second distance to provide said second output signal.

9. A system for counting single axles including, in combination:

a. hose means positioned on a roadway so that a tire running over the hose means generates an air pulse;

b. air chamber means connected to the hose and including an element movable in response to said air pulse;

c. a switch means including a resilient switch arm normally biased to close but engaged to be held open by said element in the absence of any air pulses, movement of said element in response to a pulse of air disengaging said switch arm to thereby permit it to close; and

d. counting means connected to said switch means for counting the number of times the switch arm is closed.

3,914,734

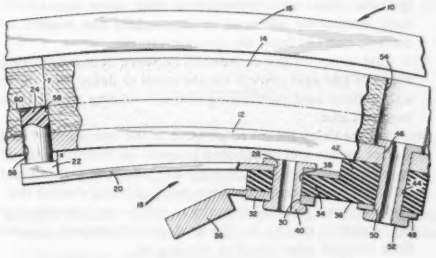
BRAKE FAILURE WARNING DEVICE

Gonzalo Rigalt, P.O. Box 126, Guatemala City, Guatemala

Filed May 2, 1973, Ser. No. 356,425

Int. Cl.[2] B60T *17/22*

U.S. Cl. 340—52 A **7 Claims**



1. A brake lining wear detector for a brake including an electrically conductive brake shoe and brake drum comprising:

a. an electrically conductive leaf spring spaced apart from said brake shoe, said leaf spring being biased at one end towards said shoe;

b. means for connecting the other end of said leaf spring to a first arcuate portion of said shoe, said connecting means electrically insulating said other end from said first portion;

c. an electrically conductive plate connected to said one end of said leaf spring, said plate being mounted on the side of said spring facing said brake shoe and being spaced apart from said shoe;

d. a pin connected to said conductive plate, said pin extending through an aperture in a second arcuate portion of said brake shoe a predetermined distance into the brake

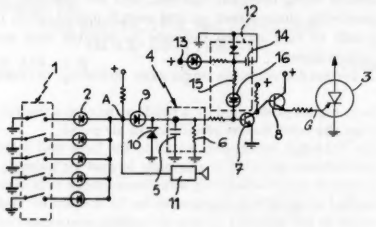
lining, said pin being slidable within the brake lining and spaced apart from said drum; and

e. first means coupled to said brake shoe, said plate and said leaf spring for providing a brake lining wear signal when said plate contacts said brake shoe.

3,914,735
RELIABLE SAFETY ALARM DEVICE FOR AUTOMOTIVE VEHICLE WITH ENGINE TIME DELAY STOP AND STARTER OVERRIDE

Léon Guillaume, 46 Avenue de la Victoire, Neufchateau, Belgium

Filed June 7, 1973, Ser. No. 367,901
Claims priority, application Belgium, June 15, 1972, 118727
Int. Cl.² B60Q *5/00*
U.S. Cl. 340—52 F **7 Claims**



1. In an automotive vehicle including an engine, an ignition circuit for the engine, a source of electric current for the ignition circuit, starter means to energize the ignition circuit from said source of electric current, and a mechanism whose operation is governed by at least one physical parameter, a safety device comprising:

a monitoring element for said at least one physical parameter to produce an alarm signal when the physical parameter sensed thereby reaches a predetermined threshold value,

control means having an input and coupled to a point in said ignition circuit and responsive to said alarm signal from said monitoring element to disconnect the source of electric current from the ignition circuit,

first time delay means connected between said monitoring element and said control means input to delay said alarm signal from said monitoring element during a first time interval, and

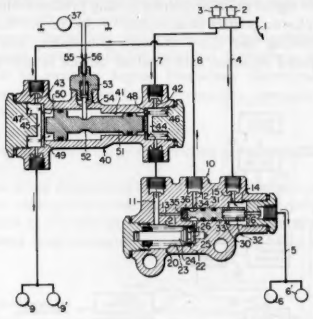
second time delay means responsive to the operation of said starter means and connected to apply an inhibiting signal to said control means during a predetermined second time interval, said second time interval being shorter than said first time interval, thereby to inhibit the operation of said control means during said predetermined second time interval when starting the engine.

3,914,736
DUAL BRAKE SYSTEM FAULT DETECTION DEVICE

Hiroyuki Nakamura, Toyoda; Hiroshi Kawaguchi, and Kiyoshi Nishiwaki, both of Susono, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Apr. 19, 1974, Ser. No. 462,528
Claims priority, application Japan, June 29, 1973, 48-72854
Int. Cl.² B60T *17/22*
U.S. Cl. 340—52 C **4 Claims**

1. A fault detection device for a vehicle dual brake system including brake actuating means, a front brake circuit including a front master cylinder and front wheel cylinders, a rear brake circuit including a rear master cylinder and rear wheel cylinder, conduit means operatively connecting said master cylinders to apply braking fluid pressure to said wheel cylinders to brake said vehicle in response to operation of said actuating means, and regulating valve means reducing in said rear wheel cylinders the rate of rise of braking fluid pressure therein after said pressure has exceeded a predetermined level, said fault detection device comprising means for sensing a predetermined level of pressure imbalance between said rear

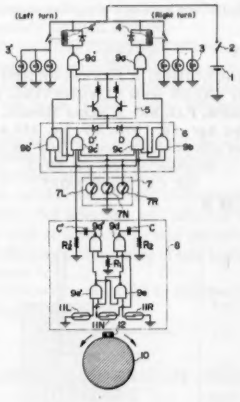


master cylinder and said rear wheel cylinders, and signal means responsive to said sensing means for generating a signal upon occurrence of said pressure imbalance to indicate a fault in said system.

3,914,737
DIRECTION TURN SIGNAL SYSTEM

Hitoshi Sato, Yokohama, Japan, assignor to Niles Parts Company Limited, Tokyo, Japan

Filed Nov. 20, 1974, Ser. No. 525,738
Int. Cl.² B60Q *1/34*
U.S. Cl. 340—55 **1 Claim**



1. A directional turn signal system comprising a handle post, a permanent magnet attached to said handle post, three reed switches arranged around said handle post for sensing a right turn, a left turn and the neutral position of said handle post, a flip-flop circuit composed of a first pair of NAND circuits to which the impulses from the reed switches for sensing the left turn and the right turn of said handle post are fed as inputs, a second pair of NAND circuits to which the logical product of the outputs of said first pair of NAND circuits and the impulse from the reed switch for sensing the neutral position of the handle post is fed as inputs, a group of the manual right turn, left turn and the neutral switches, a pair of flip-flop circuits each comprised of a pair of NAND circuits respectively and their inputs being impulses from the right and the

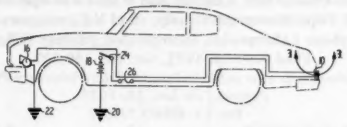
left turn switches and from the neutral switch as well as from the outputs of the second pair of NAND circuits through condensers, and resistors, diodes for transmitting the outputs of a pair of the NAND circuits from said flip-flop circuits to an oscillator, a third pair of NAND circuits the inputs thereof being the outputs of the other pair of NAND circuits from said flip-flop circuit and the impulse from the oscillator, and a pair of relays connected to the third pair of NAND circuits respectively for flashing right and left hand signal lamps.

3,914,738

MOTOR VEHICLE ALARM SYSTEM

Louis Alphonso Hager, 2432 Bay St., Charlotte, N.C. 28205

Filed June 24, 1974, Ser. No. 482,013
Int. Cl.² B60R *25/10*
U.S. Cl. 340—63 **6 Claims**



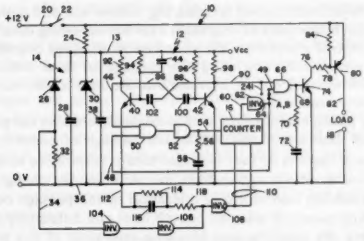
1. An alarm system for a motor vehicle gasoline supply tank comprising a mercury contact switch, electrical connection between the motor vehicle horn, an electrical energy supply and said mercury switch means for mounting said mercury switch in an angled position on a movable access panel to said gasoline supply tank, said mounting being positioned such that the movement of said panel causes the tilting of said mercury switch to complete an electric circuit between the electrical supply and horn thereby sounding said horn.

3,914,739

VEHICLE BRAKE AND INDICATOR LIGHT CONTROL SYSTEM

James Daniel Caughlin, and William John Ozeroff, both of La Jolla, Calif., assignors to James Daniel Caughlin, La Jolla, Calif.

Filed Jan. 31, 1972, Ser. No. 222,188
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² B60q *1/26*
U.S. Cl. 340—72 **5 Claims**



1. In a vehicle brake and indicator light control system,

a first electrical circuit for energizing signal lights,

first and second switch means in said first electrical circuit, said first switch means closing said first electrical circuit and energizing said signal lights in response to actuating the vehicle's brakes,

said second switch means opening said first electrical circuit and de-energizing said signal lights upon being de-energized,

a source of timed pulses,

second circuit means responsive to said closing of said first switch means for initating timed pulses from said source, counter means for counting said timed pulses and providing output pulses in response to counting said timed pulses and a steady state output signal after counting a given number of said pulses,

gate means responsive to said timed pulses and said output pulses for providing an output signal to said second switch means energizing and deenergizing said second switch means and said signal lights,

and said gate means being responsive to said steady state output signal for energizing said second switch means closing said first electrical circuit.

3,914,740

ERROR DETECTOR FOR PSEUDO-RANDOM SEQUENCE OF DIGITS

Swan Bing Han, Hazeldean, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Sept. 4, 1973, Ser. No. 394,088
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G08C *25/00*
U.S. Cl. 340—146.1 E **7 Claims**

1. In an error detector for a pseudo-random sequence of digits comprising:

means responsive to said sequence of digits for generating a replicated sequence of digits; and

means for comparing corresponding digits of the replicated sequence with those of said pseudo-random sequence to derive indicated error digits when anticoincidence is detected between said sequences;

the improvement comprising:

means responsive to true error digits for generating replicated error digits; and

means for comparing said indicated error digits with said replicated error digits to derive said true error digits when anticoincidence is detected between said indicated and replicated error digits.

3,914,741

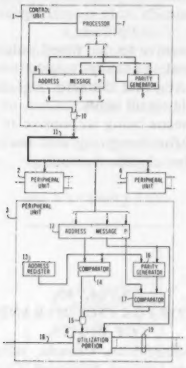
FAULT DETECTION ARRANGEMENT FOR DIGITAL TRANSMISSION SYSTEM

Richard Harlan Bonser, North Aurora, and Robert Joseph Willett, Winfield, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 1, 1973, Ser. No. 411,633
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H04L *1/10*
U.S. Cl. 340—146.1 C **7 Claims**

1. In an information receiving circuit for receiving digital words which comprise a digital address portion, a digital message portion, and an error detecting code portion derived from the combination of said digital address and said digital message a protection arrangement comprising means for storing a digital address, means for comparing the digital address portion of a received digital word with the digital address stored in said storage means, encoding means for deriving an error detecting code from the combination of the digital message portion of a received digital word and the digital address stored in said storage means, means for comparing the error detecting code derived by said encoding means with the error

detecting code portion of a received digital word, and means for generating an enable signal when both of said means for



comparing indicate that their respective compared quantities are identical.

3,914,742

APPARATUS FOR USE IN OPTICAL READING MACHINES FOR TRANSFORMING A TWO-DIMENSIONAL LINE PATTERN INTO OPTO-ELECTRONICALLY DETECTABLE IMAGES

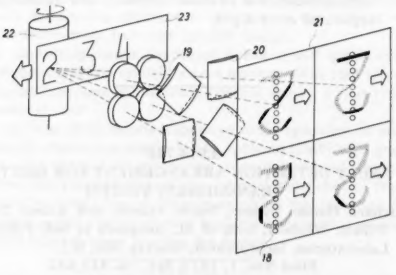
Ebbe Munster, Horsholm, and Per Ponsaing, Copenhagen, both of Denmark, assignors to Instituttet for Produktudvikling, Lyngby, Denmark

Filed June 19, 1974, Ser. No. 480,791

Claims priority, application Denmark, June 25, 1973, 3510/73

Int. Cl.² G06K 9/12

U.S. Cl. 340—146.3 F **5 Claims**



1. An apparatus for use in an optical pattern recognition system for the optical input transformation of a two-dimensional line pattern in a number of separated channels into opto-electronically detectable images, the images in each of said channels being correlated with said pattern and extracting a particular line orientation therein, said channel images forming together the optical input information for a subsequent classification of said pattern into one of a given number of pattern classes, said apparatus comprising a common object plane for all said channels; means at said object plane for positioning said line pattern; optical transformation means in each of said channels constituted by optical filters having unidirectional power of resolution and one-dimensional redundance, said optical filters being arranged in different ones of said channels with mutually differing directions of resolution; an image plane in each of said channels; means for subdividing the image of said pattern formed in each of said image planes in two mutually orthogonal directions into a raster of elementary areas each comprising a portion only of the entire pattern image; and photo-sensitive means arranged at each of said image planes for selectively detecting the optical input information from each elementary area simultaneously in all said channels, said input information being constituted by the luminous intensity received by said photo sensitive means, said photo sensitive means being adjusted to supply an electric output signal in response to the magnitude of said luminous intensity relative to a threshold.

3,914,743

DATA SYSTEM MULTIBRANCH JUNCTION CIRCUIT HAVING BRANCH LINE SELECTION

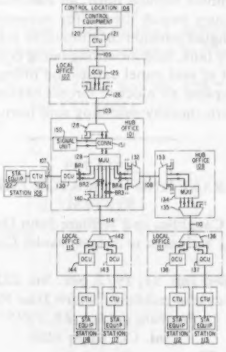
Scott McDowell Fitch, Holmdel; Leo Michael Kolensky, Irvington; Joseph Conrad Panek, Jackson Twp., Ocean County; David Charles Rife, Lincroft, and Walter Rudolph Schaefer, Wall Twp., Monmouth County, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 24, 1972, Ser. No. 309,207

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl. H04Q 5/00

U.S. Cl. 340—147 R **8 Claims**



1. A junction circuit terminating a main line and a plurality of branch lines and having means for broadcasting data words and control words from the main line to all of the branch lines and means for controlling the passage of data words and control words from each of the branch lines to the main line characterized in that

the passage controlling means normally enables the passage of data words and blocks the passage of control words and there is further included means responsive to branch line selection signals from the main line for changing the enabling and blocking operation of the passage controlling means of selected branch lines and differently changing the enabling and blocking operation of the passage controlling means of unselected branch lines.

3,914,744

SHIFTING APPARATUS

James L. Brown, Chelmsford, Mass., assignor to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jan. 2, 1973, Ser. No. 320,011

Int. Cl.² G11C 19/00, 13/00

U.S. Cl. 340—172.5 **16 Claims**

1. Shifting apparatus for bidirectionally shifting a block of

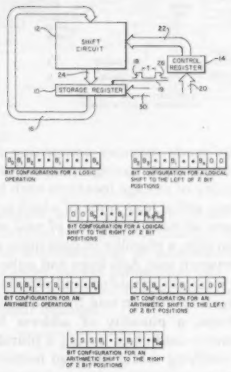
data one or more bit positions at a time in response to a shift command, said shifting apparatus comprising:

register means for storing a block of data, said register means comprising a plurality of *n* bit storage locations with each bit storage location defining a particular bit position relative to the other bit storage locations;

a plurality of *n* lines each of which is connected to one of said *n* bit storage locations so as to be capable of transmitting the bit contents of the particular storage location; and

shifting means, connected to said *n* lines so as to receive the incoming block of data, for bidirectionally shifting the block of data one or more bit positions at a time, said shifting means comprising:

a plurality of substages each consisting of only *n* bit shift cells with *n* substage output lines, said plurality of *n* substage output lines being either connected to the following substage or to the *n* bit storage location of said register means, each bit shift cell occupying a specific position and comprising:


SHIFT CIRCUIT
CONTROL REGISTER
STORAGE REGISTER
BIT CONFIGURATION FOR A LOGIC OPERATION
BIT CONFIGURATION FOR A LOGICAL SHIFT TO THE LEFT OF Z BIT POSITIONS
BIT CONFIGURATION FOR A LOGICAL SHIFT TO THE RIGHT OF Z BIT POSITIONS
BIT CONFIGURATION FOR AN ARITHMETIC OPERATION
BIT CONFIGURATION FOR AN ARITHMETIC SHIFT TO THE LEFT OF Z BIT POSITIONS
BIT CONFIGURATION FOR AN ARITHMETIC SHIFT TO THE RIGHT OF Z BIT POSITIONS

a respective subgrouping of input lines, said respective subgrouping input lines being a subgroup of said plurality of *n* lines, wherein the respective subgrouping of input lines comprises:

a first input line being operative to input a bit occupying the bit position corresponding to the bit position of the particular bit shift cell, and

a plurality of input lines adjacent to said first input line, each of said plurality of adjacent input lines being operative to input a bit occupying a different bit position from the bit position occupied by the particular bit shift cell, wherein each of said bit shift cells comprises:

first gating means for gating any bit present on said first input line to the output of said bit shift cell

a plurality of second gating means for gating respective bits present on the plurality of input lines adjacent to said first input line to the output of said bit shift cell, and

means for selectively activating only one of said gating means in response to the shift command for the particular substage.

3,914,745

SYSTEM AND METHOD FOR ALIGNING TEXTUAL CHARACTER FIELDS

Donald Walter Cooper, and James Bradley Unruh, both of Austin, Tex., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 26, 1973, Ser. No. 427,616

Int. Cl.[2] G06F *3/10, 7/00*

U.S. Cl. 340—172.5 **3 Claims**

1. A system for arranging the sequence of textual codes upon input of said codes into a recirculating memory having an operation flag code defining an operating point therein said system being operative to print said codes so arranged, comprising:

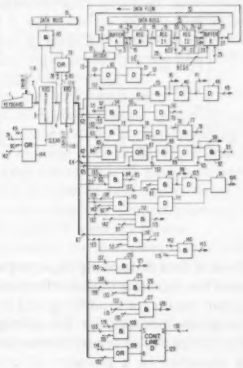
a keyboard for generating textual character codes, a decimal tab control code and a field-end code;

a decimal tab flag code generator for generating a decimal tab flag code;

a decoder connected to said memory for generating an OP FLAG signal in response to the detection, at a point in said memory, of said operation flag code and for generating a DEC TAB FLAG signal in response to the detection of said decimal tab flag code at said point in said memory; decimal tab flag code input gating means connected to said decimal tab flag code generator, said memory, said keyboard, and said decoder and responsive to the generation of said OP FLAG signal and the keyboard generation of said decimal tab control code for inserting said decimal tab flag code into said memory at a storage location ahead of said operation flag;

a backspace code generator for generating backspace codes;

backspace code input gating means connected to said keyboard, said backspace code generator, said memory, and said decoder and responsive to the keyboard generation of one of said textual character codes and said DEC TAB FLAG signal for inserting one of said backspace codes into said memory in a memory storage location next succeeding the memory storage location of said decimal tab flag code;



textual character code input gating means connected to said keyboard, said memory, and said decoder and responsive to the generation of said one of said textual codes and said OP FLAG signal for inserting said one of said textual codes into said memory in a memory storage location next preceding the storage location of said operation flag code;

said backspace code input gating means and said textual character code input gating means cooperating with said keyboard, said backspace code generator and said decoder to provide for the storage isn said memory of said decimal tab flag code followed by a contiguous stream of backspace codes, followed by a contiguous stream of textual character codes, followed by said operation flag code;

a decimal point latching means connected to said keyboard and said backspace code input gating means for inhibiting the input of backspace codes into said memory after the keyboard generation of a decimal point textual character code;

a printer and printer gating means connecting said printer to said memory, said printer gating means being connected to said backspace code input gating means for enabling said printer to backspace once as each of said backspace codes is inserted into said memory; and

a print latching means connected between said keyboard and said printer gating means, said print latching means responding to the keyboard generation of said field-end code for enabling said printer gating means to print said textual character codes inserted into said memory.

3,914,746

ELECTRONIC DATA-PROCESSING SYSTEM AND METHOD OF OPERATING SAME

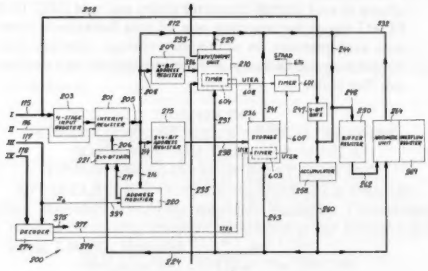
Hans-Joachim Steinmetz, Karlsruhe; Helmut Rahm, Kandel, and Karl-Ludwig Paap, Karlsruhe, all of Germany, assignors to Matth. Hohner AG, Trossingen, Germany

Filed Feb. 25, 1974, Ser. No. 445,134

Claims priority, application Germany, Feb. 23, 1973, 2309029

Int. Cl.[2] G06F 9/00

U.S. Cl. 340—172.5 23 Claims



1. A method of data processing in a computer provided with storage means for retaining digital information, an accumulator input/output means for modifying said digital information, and a subprogram memory for the storage and sequential readout of a multiplicity of binary instruction words of invariable length classified in a plurality of categories including numerical instructions, routing instructions and jump instructions, comprising the steps of:

dividing each stored instruction work into a plurality of sections including a classification section, an operation-/address section and a data/address section;

identifying said jump instructions by a characteristic binary value of a discriminating bit in said classification section; determining the category of each instruction word read out from said memory by decoding the classification section thereof;

simultaneously decoding the operation/address section of said word;

transmitting the contents of the data/address section of a word identified as a numerical instruction to said accumulator for arithmetic processing in response to operational commands derived from the decoded classification and operation/address sections thereof;

selecting digital information for exchange between said accumulator, said storage means and said input/output means and treating the selected information in conformity with operational commands derived from the decoded classification and operation/address sections thereof; and

altering the readout sequence of said subprogram memory in response to the contents of at least part of a word identified as a jump instruction.

3,914,747

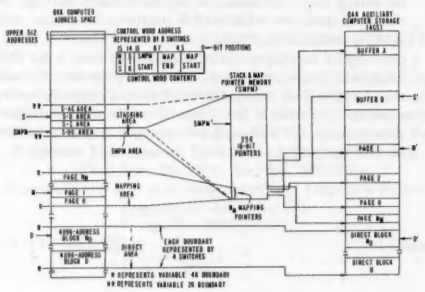
MEMORY HAVING NON-FIXED RELATIONSHIPS BETWEEN ADDRESSES AND STORAGE LOCATIONS

Elwood Eugene Barnes, Sound Beach; Sidney Thomas Emerson, Coram; Paul Clifton Rogers, Brookhaven, and Wilburn Dwain Simpson, Port Jefferson, all of N.Y., assignors to Periphonics Corporation, Bohemia, N.Y.

Filed Feb. 26, 1974, Ser. No. 446,116

Int. Cl.[2] G06F 13/00

U.S. Cl. 340—172.5 79 Claims



1. A multi-mode memory comprising a first plurality of storage locations each having a respective access address, a second plurality of storage locations each having a respective access address and at least some of which are used for containing the access addresses of some of said storage locations in said first plurality, a plurality of data lines, means for transferring data between said data lines and either a selected one of the storage locations in said second plurality or a selected one of the storage locations in said first plurality having a derived access address, a plurality of address lines for receiving thereon memory addresses having a plurality of bits therein, means for verifying that a received memory address on said address lines is contained within one of several predetermined groups of memory addresses, and means responsive to the operation of said verifying means for deriving the access address of a selected storage location in either said first or said second plurality for use by said data transferring means, said deriving means including means for identifying from a received memory address a storage location in said second plurality and for deriving the access address of a selected storage location in said first plurality of performing a predetermined operation on the access address contained in the identified storage location in accordance with the values of at least some of the bits in the received memory address responsive to the received memory address being contained in at least one of said predetermined groups, said deriving means operating in one of several different modes in accordance with which predetermined group of memory addresses contains the received memory address.

3,914,748

ISOLATION-ELEMENT CCD SERIAL-PARALLEL-SERIAL ANALOG MEMORY

James B. Barton, and Tom F. Cheek, Jr., both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 29, 1974, Ser. No. 464,885

Int. Cl.[2] G11C 11/40

U.S. Cl. 340—173 R 11 Claims

1. A charge coupled shift register for handling time sampled analog information input packets comprising:

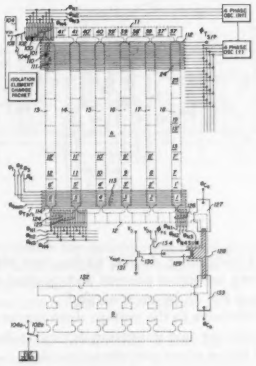
a. an isolation element charge packet producing means,

b. a serial input channel to receive alternately isolation element charge packets from said isolation element charge packet producing means and information packets, and a serial output channel connected to said input chan-

nel by a plurality of parallel channels wherein all said channels are formed in a semiconductor body,

c. arrays of multi electrode sets of phase electrodes insulated from and overlaying said input, parallel and output channels,

d. an output transfer electrode common to all of the parallel channels,



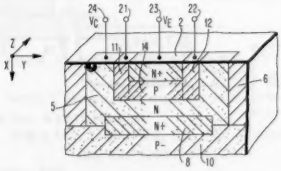
e. means to actuate said transfer electrode to transfer charge packets from each parallel channel into said output channel for summation at an information and isolation element charge packet summation rate, and

f. means to clock the combined charge packets to the output of said output channel.

3,914,749
D.C. STABLE SINGLE DEVICE MEMORY CELL

Shashi Dhar Malaviya, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,538
Int. Cl.² H01L *7/36*
U.S. Cl. 340—173 R **21 Claims**



1. A transistor memory cell comprising:

an emitter, a base and a collector;

said base including an intrinsic region and first and second extrinsic regions adjacent said intrinsic region;

means for applying potentials to said emitter, collector and at least said first extrinsic region;

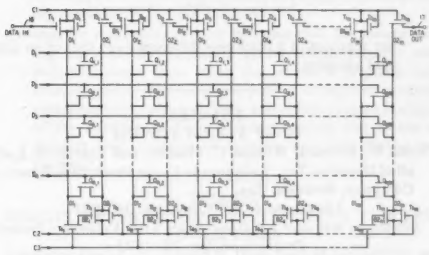
said intrinsic region having an area which is substantially coextensive with said emitter, and having a relatively low doping level such that the application of reverse biases to said emitter and collector with respect to said base causes said intrinsic base region to be pinched off;

whereby the potentials at said emitter and at second extrinsic base region may assume two stable levels indicative of two stable memory conditions.

3,914,750
MNOS MEMORY MATRIX WITH SHIFT REGISTER INPUT AND OUTPUT

David R. Hadden, Jr., Eatontown, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 5, 1974, Ser. No. 529,876
Int. Cl.² G11C *8/00, 11/40, 19/28*
U.S. Cl. 340—173 R **6 Claims**



1. A random-access, block-oriented, non-volatile memory for storing up to *n*, *m*-bit binary words, which comprises:

an $n \times m$ matrix of threshold-sensitive, semiconductor devices, each having a gate electrode and first and second current-carrying electrodes;

an *m*-stage, dynamic shift register;

m-pairs of first and second memory busses, each pair of busses being connected to a corresponding one of the stages in said *m*-stage shift register, the first and second current-carrying electrodes of each semiconductor device in a given column in said matrix being respectively connected to the first and second memory busses in a corresponding pair of memory busses;

n-row selection busses, the gate electrode of each semiconductor device in a given row of said matrix being connected to the corresponding one of said row selection busses;

means, connected to the input stage of said shift register for supplying the *m*-bit binary words to be stored in said memory;

means, connected to the output stage of said shift register, for receiving the *m*-bit binary words read-out of said memory; and

means, connected to each stage of said shift register, for serially advancing each of said *m*-bit binary words through the *m*-stages thereof and then shifting the *m*-bits, in parallel, to a selected one of the rows of said matrix for storage therein, via said first and second memory busses.

3,914,751
GAPLESS MULTITHICKNESS PROPAGATION STRUCTURE FOR MAGNETIC DOMAIN DEVICES

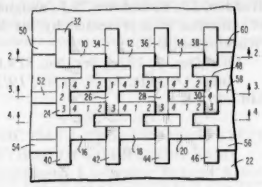
George E. Keefe, Montrose; Yeong S. Lin, Mount Kisco, both of N.Y., and Laurence L. Rosier, San Jose, Calif., assignors to International Business Machines, Corporation, Armonk, N.Y.

Filed Dec. 27, 1973, Ser. No. 429,001
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF **20 Claims**

20. In a structure comprising a magnetic medium capable of supporting magnetic bubble domains and a propagation structure for defining the path by which said domains propagate within said magnetic medium in response to different in-plane magnetic fields applied to said medium, said propagation

structure comprising:

a plurality of contiguous elements each having a rectilinear



bar segment of a thickness different from that of an adjacent element.

3,914,752

PUMP ALARM SYSTEM

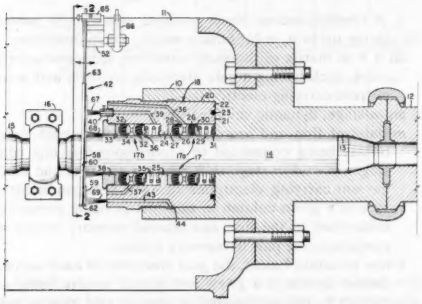
Willis W. Howard; William C. Maurer, and Everett H. Lock, all of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed June 4, 1973, Ser. No. 367,021

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.² G08B *21/00*; F01B *25/26*

U.S. Cl. 340—242 **13 Claims**



11. An alarm system for detecting incipient leakage of fluid past the plunger packing of a plunger pump which comprises: a detector member adapted to be positioned substantially around the pump plunger and to the rear of the plunger packing, said detector member being movable by high velocity fluid leakage through the plunger packing; and an alarm circuit including an indicator and a switch for actuating said indicator, said switch being movable to an activated position in response to movement of said detector member.

3,914,753

INTRUDER ALARM SYSTEM

Fan Pong Cho, Kowloon, Hong Kong, assignor to Franciscan Enterprises, Inc., Sunnyvale, Calif.

Filed Dec. 17, 1973, Ser. No. 425,195

Int. Cl.² G08B *13/18*

U.S. Cl. 340—258 B **15 Claims**

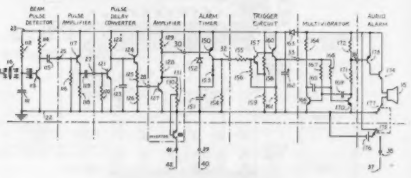
1. An electronic circuit for detecting the existence of an object in a space through which an electro-magnetic radiation beam passes, comprising:

a phototransistor having emitter, collector and base electrodes,

means for directing electro-magnetic radiation onto said phototransistor, whereby said phototransistor may be exposed to said electro-magnetic radiation beam,

said collector and emitter electrodes being connected in series with a load resistor across a two terminal voltage supply,

means connected between said voltage supply and said base electrode of the phototransistor for providing a bias that increases the zero radiation signal collector current at least several times a normal collector current that exists when the base terminal remains unconnected, said bias further set for said phototransistor to operate in a non-linear gain region with a collector bias current below that which causes the phototransistor to operate with linear gain characteristics,



an object indicating device having two states, one state indicating an object present and another state indicating an object not to be present, and

means responsive to the voltage drop across said load resistor for driving said indicating device so that it is in one of its said states when said phototransistor is receiving electromagnetic energy and another state when that electromagentic energy has been interrupted for a selected period of time.

3,914,754

MACHINE ELEMENT POSITION DETECTION SYSTEM

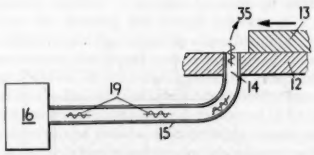
Colin John Kirk, Crowthorne, England, assignor to Martonair Limited, England

Continuation of Ser. No. 253,607, May 15, 1972, abandoned. This application June 24, 1974, Ser. No. 482,253

Claims priority, application United Kingdom, May 18, 1971, 15454/71

Int. Cl.² G08B *21/00*; G01S *9/66*; G01M *3/02*

U.S. Cl. 340—267 R **8 Claims**



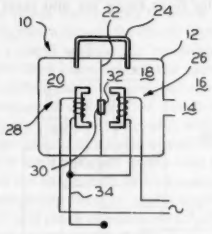
1. A method of detecting the position of an operative element of a machine whereby to enable the position of the element to be controlled, which method comprises transmitting a stream of fluid pressure wave pulses of predetermined duration and at predetermined intervals in a code which identifies said machine element through waveguide means to an outlet which is occluded in one position of the element and is unobstructed in another position of the element, in which other position said coded pulses emanate from said outlet as a coded non-directional pressure wave signal which permeates the atmosphere and detecting the emanation of said coded signal with a receiver arranged in a position independent of the position of said outlet to produce for control purposes an output signal which varies according to the position of said machine element.

3,914,755

PRESSURE CHANGE RESPONSIVE ALARM APPARATUS

Glen C. Hook, Libertyville, Ill., assignor to Vann Signal Devices, Inc., Chicago, Ill.

Filed Dec. 10, 1973, Ser. No. 423,555
Int. Cl.[2] G08B *13/08*; G01L *9/00*
U.S. Cl. 340—274 5 Claims



1. An alarm system for determining through pressure differentials that a door leading to an enclosed environment has been opened or closed,

said environment normally maintained at a pre-determined pressure,

said alarm system comprising a rate of pressure change detecting means located in said enclosed environment and adapted to sense said pressure change,

said rate of change pressure detecting means comprising a dynamic chamber coupled to said enclosed environment, a static chamber isolated from said enclosed environment,

fluid passage means connecting said dynamic chamber to said static chamber,

said fluid passage means controlling the rate of flow between the chambers as a function of the pressure differential between said chambers,

elastic diaphragm means separating said static and dynamic chambers,

variable inductive means for sensing movement of said diaphragm and varying a frequency in response to said movement,

discriminator means connected to said rate of pressure change detecting means to provide an output signal responsive to said pressure changes, and

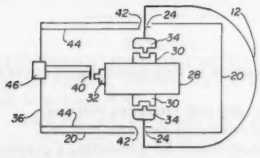
alarm means responsive to said output signal to activate a discernible alarm display device responsive to the movement of said door.

3,914,756

PORTABLE ALARM ACTUATED BY ATTEMPTED THEFT

Ronald F. Seyk, Chicago, Ill., assignor to Raymond Lee Organization Inc, a part interest

Filed Mar. 11, 1974, Ser. No. 449,634
Int. Cl.[2] G08B *13/22*
U.S. Cl. 340—280 3 Claims



1. Apparatus for sounding an alarm when a flexible cable securing a movable object to a fixed support is cut comprising a hollow housing secured to the object, said housing being open at one end and having two oppositely disposed openings in opposite side walls;

a battery powered device for sounding an audio alarm when energized, said device having a normally open microswitch and two terminals, said device being armed when the switch is closed and the two terminals electrically interconnected to thereafter sound an alarm when the connection between said terminals is broken, said device being disposed in the housing;

an elongated flexible electrical conductor having an insulated outer cover and having terminal engaging means at each end, said conductor being wrapped around the support constituting said cable, each means extending through a corresponding opening to engage a corresponding terminal of the device; and

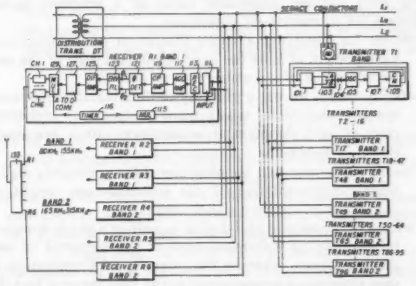
means for removably closing the open end, the means having an inwardly extending prong which engages said switch to close same when the means is in place, said closure means also having a pair of elongated inwardly extending arms which slidably and tightly engage portions of the conductor adjacent corresponding end means to prevent disconnection of terminal engaging means and terminal.

3,914,757

REMOTE METER READING SYSTEM USING ELECTRIC POWER LINES

Alexander Finlay, Jr.; Robert E. Dyer, both of Springfield, and William D. Kessler, Rochester, all of Ill., assignors to Sangamo Electric Company, Springfield, Ill.

Division of Ser. No. 230,873, March 1, 1972. This application Mar. 6, 1974, Ser. No. 448,713
Int. Cl.[2] H04M *11/04*
U.S. Cl. 340—310 A 10 Claims



1. In a system for use with the transmission lines of an alternating current, electric power distribution system, a plurality of meter transmitters, each of which is associated with a discrete meter, and each of which is operative to transmit a correspondingly different carrier signal, said carrier signals at each transmitter being at times modulated by a first set of one half cycle pulses derived from a first phase of the power on said transmission lines and being modulated at other times by a second set of one half cycle pulses derived from a second phase of the power on said transmission lines, receiver means having a receiver circuit connected to said transmission lines, adjustable tuning means operable to selectively tune said receiver circuit to receive the different carrier frequency signals on said transmission line in a predetermined pattern, phase detector means for detecting the phase of the received signals, means connected to said phase detector means for providing digital output signals representative of said received signals, a plurality of storage means, each of which is connected to store the signals which represent the information received from a different transmitter, selector means for transmitting said output signals to the assigned storage means for storage purposes, and program means for selectively operating said tuning means in the adjustment of said receiver circuit to receive the carrier signal output of each of said transmitters in said predetermined pattern, and simultaneously operating said selector means to transmit said output signals to the one of the

storage means which is preassigned to store the signal output for the transmitter which is transmitting the selected carrier frequency.

3,914,758

DIGITAL READOUT FOR DISPLAYING BOTH LONG TERM AND SHORT TERM AVERAGE VALUES OF A SIGNAL

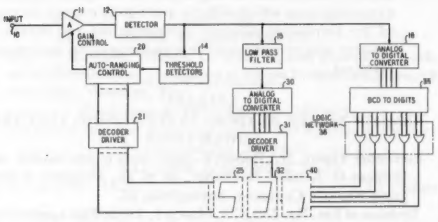
James Flagg Ingle, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 16, 1973, Ser. No. 351,493

Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.

Int. Cl.[2] G09F *9/32*

U.S. Cl. 340—336 **5 Claims**



1. In a display system of the type including a plurality of numeric display units for yielding a visual indication of the long term average amplitude value of a supplied signal, wherein the improvement comprises:

means for obtaining a visual indication of instantaneous variations in at least the least significant digit of the amplitude value of a supplied signal including,

display means having a plurality of illuminatable elements, specific amplitude values being assigned to individual ones of said elements in accordance with a pre-established code scheme,

means responsive to a supplied signal for generating digital signals representative of the instantaneous amplitude value of said supplied signal, and

means for supplying said digital signals in a predetermined relationship to individual ones of the elements of said display means, wherein the intensity of illumination of said elements is proportional to the time interval that the instantaneous amplitude value of said supplied signal is at the amplitude value assigned to said elements and wherein said illuminatable elements are arranged in a predetermined spatial relationship so that an observer may perceive a range of the instantaneous variations in said at least least significant digit of the amplitude value of said supplied signal by viewing the intensity of illumination of said elements.

3,914,759

SELSYN DIGITAL TRANSDUCER

Louis W. Herchenroeder, Williamsville, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 28, 1974, Ser. No. 437,401

Int. Cl.[2] G05B *1/06, 19/28;* **H03K** *13/02*

U.S. Cl. 340—347 SY **4 Claims**

1. A selsyn operated as a digital transducer comprising:

a. a stator having a three phase winding connected as a primary;

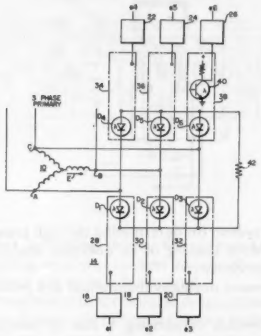
b. a rotor having a single phase winding connected as a secondary;

c. a three phase bridge circuit coupled to said three phase winding;

d. optical means coupled to said three phase bridge circuit to deliver six conduction pulses per cycle;

e. means for detecting the rotational displacement intelligence of said rotor, coupled to said single phase winding, to deliver an output pulse as a function of the alignment of said single phase winding with one of said three phase windings, every **60°** of rotor revolution; and

f. detecting and identifying means coupled to said optical coupling means and to said rotational displacement intelligence means comprising logic means and three flip flops, said flip flops being set and reset in ordered se-



quence upon the coincidence of said six conduction pulses with one of said output pulses, as a function of the instaneous rotational direction of said rotor, said logic means being coupled to said flip flops to identify as digital bits, six displacements in one direction, and six displacements in the other whereby the displacement of the rotor relative to a datum position may be indication by means of a reversible digital counter responsible to said digital bits.

3,914,760

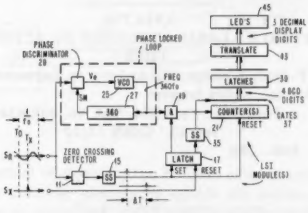
ACCURATE AND STABLE ENCODING WITH LOW COST CIRCUIT ELEMENTS

Joseph C. Logue, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1972, Ser. No. 316,789

Int. Cl.[2] H03K *13/02*

U.S. Cl. 340—347 AD **3 Claims**



1. An analog voltage to time-based digital count converter comprising:

sources of +, − and null reference voltages;

a source of unknown voltage to be encoded;

a first closed loop circuit for generating a cyclically recurrent bipolar ramp voltage signal having alternate positive and negative slope in each cycle of recurrence; said first closed loop circuit including a high-low comparison section responsive to said ramp and + and − reference voltages for producing a cyclic binary pulse reference signal and an integrating section in tandem with said compari-

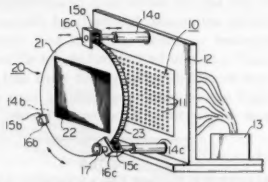
son section for integrating said binary pulse signal to develop said ramp signal;

a second closed loop circuit for continuously generating clock oscillations, at a fixed harmonic of the recurrence frequency of said ramp signal; said second loop including: a voltage controlled clock oscillator, a feedback divider coupled to the output of said oscillator for generating feedback signals, at a fixed subharmonic of the frequence of oscillation of said oscillator and a phase detector responsive to phase differences between said binary pulse reference signals and said feedback signals for producing frequency control signals for constraining said oscillations to said fixed harmonic of the ramp frequency; and means for utilizing said ramp signal relative to said +, −, null and unknown voltages for developing timed gating pulses defining segmental intervals, within successive rise and fall slope phases of a cycle of said ramp signal, having a cumulative time duration within said ramp cycle corresponding to the magnitude of said unknown voltage; said gating pulses being thereby useful for controlling digital counting of said clock oscillations to produce a recurrent digital representation of said unknown voltage, which can be made essentially insensitive to fluctuations in clock oscillator conditions and ramp slope and timing.

3,914,761
DISPLAY APPARATUS

Kenji Murase, Kakogawa; Hiroyuki Ishizaki, Akashi, and Keizo Kurahashi, Kobe, all of Japan, assignors to Fujitsu Limited, Japan

Filed Jan. 4, 1974, Ser. No. 430,628
Claims priority, application Japan, Jan. 11, 1973, 48-6479
Int. Cl.² G08B *5/36*
U.S. Cl. 340—366 B **4 Claims**



1. A display apparatus comprising

a. a display device having an arrangement of a plurality of figure points with a predetermined interval therebetween, the emit lights of said figure points being individually controllable, a picture element having a plurality of said figure points adjacent to each other, and

b. a diffraction screen having diffraction holes arranged at an angle with respect to the arrangement of said figure points of said display device so that the center of brightness of said picture element appears near the center of said picture element.

3,914,762
ELECTRONIC IDENTIFICATION SYSTEM

Richard Joseph Klensch, Trenton, N.J., assignor to RCA Corporation, New York, N.Y.

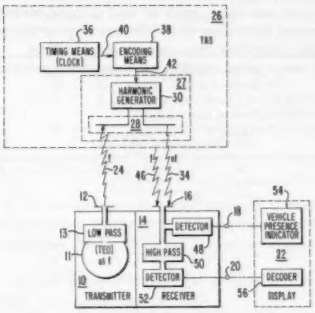
Filed Dec. 27, 1973, Ser. No. 428,721
Int. Cl.² G01S *9/56*
U.S. Cl. 343—6.5 SS **10 Claims**

1. A short range detecting and identification system of the type including a transmitter, a receiver, and at least one identification tag remotely situated relative to the transmitter and receiver, said transmitter transmitting electromagnetic energy signals of a predetermined frequency, wherein:

said tag comprises:

a harmonic radiator for deriving from said signals of said predetermined frequency signals harmonically related thereto and selectively radiating said harmonically related signals in a direction to said receiver,

encoding means, responsive to a clock signal, for modulating said derived harmonically related signals in accordance with a predeterined digital identification code, and



timing means, for deriving said clock signal; and said receiver comprises:

first detector means for detecting said modulated harmonically related signal radiated from said tag and generating output signals indicative of the identification code modulation of said radiated signal, and second detector means for sensing the presence of reflected signals of said predetermined frequency whereby the presence of an inoperative tag is sensed.

3,914,763
HYBRID FILTER EMPLOYING DIGITAL TECHNIQUES AND ANALOG COMPONENTS AND AMTI RADAR EMPLOYING SAME

Herbert Green, Elmsford, N.Y.; Robert A. Guarino, Monroe, and John H. Fitzgerald, Norwalk, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Aug. 30, 1973, Ser. No. 392,894
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² G01S *9/42;* **H04B** *1/10*
U.S. Cl. 343—7.7 **9 Claims**

1. An Mth order integrating filter comprising:

input means receiving a time varying electrical signal to be filtered;

timing means providing first and second sequences of related timing signals, said first sequence timing signals appearing at times other than the times of appearance of said second sequence timing signals;

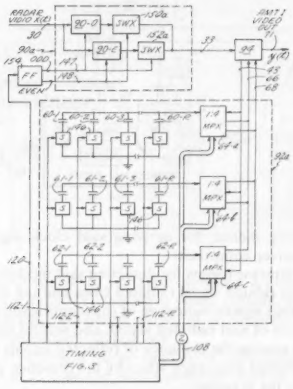
quantizer means responsive to said input means for sampling said signal to be filtered in response to said first sequence of timing signals, said quantizer means presenting between successive ones of said first sequence of timing signals a voltage representative of the magnitude of the signal to be filtered at the time of sampling;

first and second voltage summation means, each having at least M inputs with different scale factors, said quantizer means being connected to a first input of said first summation means the output of said first summation means being connected to a first input of said second summation means, the output of said second summation means comprising the output of said filter;

a plurality of voltage storage means, there being at least as many as there are inputs to one of said summation means; and

electronic switch means responsive to said timing means for connecting each of said storage means, in a cyclically repetitive sequence in response to successive ones of said second sequence of timing signals, first to said first input of said second summation means, second to second inputs of both said first and second summation means, and, if there are more than two inputs to said summation means, successively to successive inputs of both said first and second summation means, each of said summation means inputs being connected to only one of said storage means at any one time, each of said storage means being connected according to a different step in the related cyclically repetitive sequence at any one time.

9. A range gated integrating radar video processor comprising:



input means receiving a time varying electrical signal to be filtered;

timing means providing first and second sequences of related timing signals, said first sequences timing signals appearing at times other than the times of appearance of said second sequences timing signals, said timing means providing a plurality of said first sequences of timing signals, each related to a different range gate;

a plurality of quantizer means, each responsive to said input means for sampling said signal to be filtered in response to a corresponding one of said first sequences of timing signals, said quantizer means presenting, between successive ones of a related first sequence of timing signals, a voltage representative of the magnitude of the signal to be filtered at the time of sampling;

a plurality of sets of first and second voltage summation means, each having at least M inputs with different scale factors, each of said quantizer means being connected to a first input of a related one of said first summation means, the output of each first summation means being connected to a first input of the second summation means of the same set, the output of said second summation means comprising the output of said processor;

a plurality of sets of voltage storage means, one set for each set of said summation means, there being at least as many in each set as there are inputs to each of said summation means; and

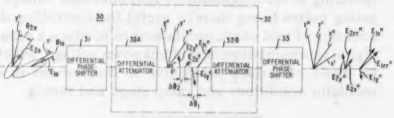
a plurality of electronic switch means, one for each of said sets, each responsive to said timing means for connecting each of said storage means to the related summation means in a cyclically repetitive sequence in response to successive ones of said second sequence of timing signals, first to said first input of said second summation means, second to second inputs of both said first and second summation means, and, if there are more than two inputs to said summation means, successively to successive inputs of both said first and second summation means, each of said summation means inputs being connected to only one of said storage means at any one time, each of said storage means being connected according to a different step in the related cyclically repetitive sequence at any one time.

3,914,764

APPARATUS FOR REDUCING CROSS COUPLING BETWEEN ORTHOGONAL POLARIZATIONS IN SATELLITE COMMUNICATION SYSTEMS

Edward Allen Ohm, Holmdel, N.J., assignor to Bell Telephone Laboratories, Murray Hill, N.J.

Filed Mar. 4, 1974, Ser. No. 447,588
Int. Cl. H04b *7/10, 15/00*
U.S. Cl. 343—100 PE **10 Claims**



1. Apparatus responsive to first and second elliptically polarized waves which are formed by the action of a transmission channel on first and second linearly polarized waves, said first and second linearly polarized waves being polarized along first and second orthogonal polarization directions which rotate, thereby causing the characteristics of said first and second elliptically polarized waves to change, comprising:

polarization conversion means including a first differential phase shifter, a first differential attenuator and a second differential phase-shifter;

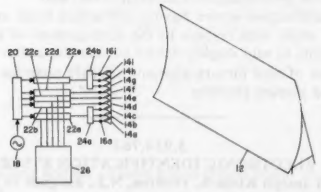
said first and second differential phaseshifters and said first differential attenuator having fixed characteristics which are adjusted to cause said first and second elliptically polarized waves to be converted, for all rotations of said first and second directions, into third and fourth linearly polarized waves which are replicas, respectively, of said first and second linearly polarized waves.

3,914,765

SIMPLIFIED DOPPLER ANTENNA SYSTEM

Stuart P. Litt, Greenlawn; Melvin J. Zeltser, Oceanside; Richard J. Giannini, Setauket, and Richard F. Frazita, Deer Park, all of N.Y., assignors to Hazeltine Corporation, Greenlawn, N.Y.

Filed Nov. 5, 1974, Ser. No. 521,118
Int. Cl.[2] **G01S** *1/38;* **H01Q** *3/26*
U.S. Cl. 343—106 D **13 Claims**



1. An antenna system for radiating wave energy into a desired region of space during a selected time period in a desired radiation pattern, wherein the frequency of said radiated wave energy within a selected portion of said region varies with at least one of the components of angular direction from said antenna system and wherein the frequency of said radiated wave energy within at least one remaining portion of said region is representative of the sense of said component of

angular displacement with respect to said selected portion of said region, comprising:

an antenna unit capable of radiating a plurality of beams in different directions within said region of space from a common aperture, and having a plurality of wave energy input ports such that each of said ports corresponds to one of said beams;

and means for simultaneously supplying a plurality of wave energy signals during said time period, one to each of said ports, each wave energy signal supplied to a port corresponding to a beam primarily within said selected portion having a phase, measured with respect to the phase of the wave energy signal supplied to the port corresponding to an adjacent antenna beam, which varies during said time period between a predetermined pair of values, said variation being less than 360°, and the sense of said variation being alike for pairs of antenna ports corresponding to similarly adjacent beams, and each wave energy signal supplied to a port corresponding to a beam primarily within said remaining portion having the same phase variation as the wave energy signal supplied to the port corresponding to the antenna beam within said selected portion which is adjacent to said remaining portion;

whereby when said signals are supplied to said antenna ports said antenna radiates said desired radiation pattern.

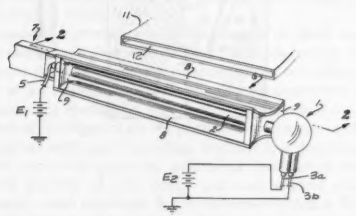
3,914,766
PULSATING PLASMA DEVICE

Richard L. Moore, 2409 East St., Davenport, Iowa 52803

Continuation-in-part of Ser. No. 75,045, Sept. 24, 1970, abandoned, which is a continuation-in-part of Ser. No. 840,087, June 2, 1969, abandoned, which is a continuation-in-part of Ser. No. 408,464, Oct. 29, 1964, abandoned. This application Oct. 16, 1973, Ser. No. 406,801

Int. Cl. H01q *1/26;* **G21b** *1/00*

U.S. Cl. 343—701 **10 Claims**



1. A pulsating plasma device comprising:

means providing a cylindrical plasma column;

at least one field exciter member having substantial length and being supported in spaced parallel relationship to the longitudinal axis of said plasma column and electrically insulated therefrom, said field exciter member having a substantial surface width in a direction generally transverse to the longitudinal axis of the plasma column, the inner surface of said field exciter member facing toward said plasma column being curved in a plane perpendicular to the longitudinal axis of said column;

the curved characteristic of the inner surface of said at least one field exciter member being also constant throughout a substantial length of the field exciter member, the curvature and physical positioning thereof being so selected that the near force field developed thereby is at least approximately proportional to the sine of m times the angle θ;

here m is an integer which is zero for one field exciter member and the near force field is magnetic, one for two field exciter members, and two for four field exciter members,

and where θ is the angle in cylindrical coordinates in the plane perpendicular to said longtudinal axis; and

electric circuit means coupled to at least said one field exciter member and having an operating frequency related to the physical plasma characteristics in accordance with the following table:

Approximate Eigenvalues

Motion Type	Near Field Variation		Frequency
$R\ \theta\ Z$	m	p	f
√ X X	0	0	$(C/\sqrt{2\pi\sigma})(1-A_l)^{1/2}$
√ √ X	0	0	$(C/\sqrt{2\pi\sigma})(1-A_l+\Omega^2)^{1/2}$
√ √ X	1	0	$-\Omega/2\pi\pm(C/2\pi\sigma)[(3-2A_l)\gamma]^{1/2}$ (fundamental is $\approx -\Omega/2\pi\pm C/\sqrt{2\pi\sigma}$)
√ X √	0	p	$-Up/4L\pm[C^2p^2/16L^2+C^2(1-A_l)/2\pi^2\sigma^2]^{1/2}$

where (R, θ, Z) are cylindrical coordinates of a coordinate system having its origin on the longitudinal axis of said column and its Z axis along the longitudinal axis of said column and wherein,

R = the motion component of the plasma in the radial direction

θ = the motion component of the plasma in the azimuthal direction,

Z = the motion component of the plasma in the axial direction,

p = an integer,

A_l = the eigenvalue of the confluent hypergeometric function ${}_1F_1(A, B, D)$ where

$B = 2$

$D = r_o^2/2\sigma^2$

r_o = the plasma radius

σ = the standard deviation of the plasma density in the radial direction,

C = the acoustic wave phase velocity in the plasma

Ω = the mean angular velocity of the plasma column about its axis,

whereby said near field distribution at resonant frequencies has an azimuthal variation given by sin $(m\theta)$ and an axial variation given by cos $(\pi pz/2L)$ where,

L = the total length along the longitudinal axis of the field exciter members,

whereby the entire plasma device oscillates and the oscillating energy is transferred between said plasma column and said field exciter member at said defined operating frequency.

3,914,767
MONOLITHIC, ELECTRICALLY SMALL, MULTI-FREQUENCY ANTENNA

Howard S. Jones, Jr., Washington, D.C., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 11, 1974, Ser. No. 478,204

Int. Cl.² H01Q *1/28*

U.S. Cl. 343—708 **4 Claims**

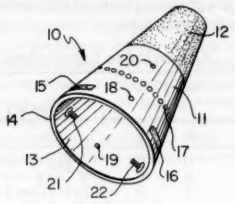
1. In the projectile of the class wherein a signal is generated within a projectile to be transmitted from an antenna, the improvement comprising:

a. a dielectric material shaped to conform to the nose cone of said projectile and adapted to be part of its exterior wall structure;

b. a metallic coating deposited on the inside surface of said dielectric and extending to cover a portion of the outside surface so as to leave the tip of said nose cone exposed to define an open end dielectric loaded radiator;

c. a slot shaped aperture in said coating located at the base of said nose cone to expose a portion of said dielectric and thereby define a slotted dielectric loaded cavity; and

d. a plurality of metallic coated holes in the metallic coated portion of said nose cone circumferentially disposed to electrically separate the open end dielectric loaded radiator from the slotted dielectric loaded cavity.

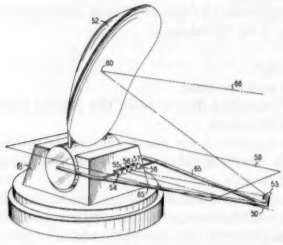


3,914,768

MULTIPLE-BEAM CASSEGRAINIAN ANTENNA

Edward Allen Ohm, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 31, 1974, Ser. No. 438,201
Int. Cl. H01q *19/14*
U.S. Cl. 343—779 **9 Claims**



1. A multiple beam antenna comprising a main reflector having an aperture, a smaller subreflector, said antenna having an on-axis focal point lying outside the aperture, a plurality of means for feeding energy toward the subreflector, at least one of the feeding means being displaced from the on-axis focal point, the subreflector having a surface area elongated to avoid spillover in each direction corresponding to the displacement of a feeding means from the on-axis focal point, the feeding means and the subreflector being positioned so that they lie outside the aperture of the main reflector and center the energy from each feeding means on the main reflector, the subreflector reflecting energy from the feeding means directly to the main reflector.

3,914,769

METHOD FOR FABRICATING LUNEBERG LENS

William J. Andrews, 9633 Parkwood Drive, Bethesda, Md. 20014

Filed Jan. 14, 1974, Ser. No. 432,999
Int. Cl.² H01Q *15/08*
U.S. Cl. 343—911 L **6 Claims**

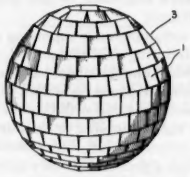
1. A method for constructing a Luneberg lens comprising the following steps:

a. cutting a batch of Luneberg lens material into cubes;

b. determining the indices of refraction of said cubes;

c. cementing said cubes together in accordance with their respective indices of refraction to form a first approximation of a Luneberg lens sphere;

d. cutting said sphere into thin slices along a first axis; and



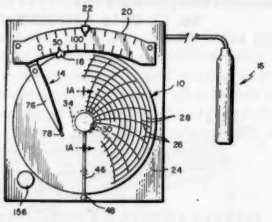
e. reassembling said slices out of registry in an angular coordinate to again form said sphere.

3,914,770

TEMPERATURE CONTROL RECORDER

Robert D. Reis, Hingham, Mass., assignor to United Electric Controls Company, Watertown, Mass.

Filed Apr. 8, 1974, Ser. No. 459,007
Int. Cl.² G01D *13/26*
U.S. Cl. 346—17 **16 Claims**

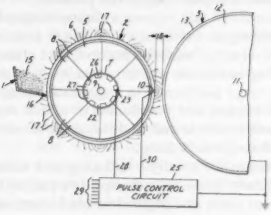


1. A temperature control for regulating and recording temperature comprising control means, a pivotally supported rocker supported with one end adjacent the control means, a temperature responsive motor supported adjacent the other end of the rocker operable by engagement with said other end to move the one end in a direction to actuate the control means, means supporting the control means for movement relative to said one end of the rocker to set the control means for operation at a predetermined temperature, manually operable means for effecting movement of the control means relative to said one end of the rocker, a fixed temperature scale, indicators pivotally supported on a common axis for movement along said fixed temperature scale, linkage connecting one of the indicators to said manually operable means so that the setting selected by said manually operable means is indicated on the scale, linkage connecting the other indicator to the rocker so that the temperature at any given time is indicated on said scale, a chart bearing temperature and time scales, a motor connected to the chart for rotating it at a predetermined rate, a scriber supported in engagement with the chart and linkage connecting the scriber to said one end of the rocker for movement in consonance with said other indicator as the latter moves along the scale to trace the temperature on the chart.

3,914,771
ELECTROGRAPHIC RECORDING PROCESS AND APPARATUS EMPLOYING SYNCHRONIZED RECORDING PULSES

George G. Lunde, White Bear Lake, and Stan J. Opseth, Lakeland, both of Minn., assignors to Minnesota Mining & Manufacturing Company, Saint Paul, Minn.

Filed Nov. 14, 1973, Ser. No. 415,623
Int. Cl.² G03G 15/06
U.S. Cl. 346—74 ES 21 Claims



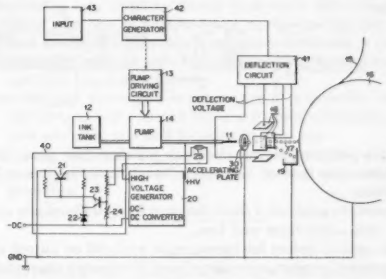
1. An electrographic recording process for the deposition of toner on a recording medium, which process comprises:
1. arranging first and second electrode means in a spaced opposed relationship to provide a recording region therebetween;
2. arranging a recording medium in said recording region with a first surface in electronic contact with said second electrode means;
3. drawing electronically conductive, magnetically attractable toner into the recording region by means of an alternating magnetic field so that the toner is interposed between said first electrode means and a second surface of said recording medium to form an electronically conductive path therebetween, whereby a portion of said toner is in physical contact with said second surface of said recording medium; and
4. establishing voltage potential pulses of short duration between said first and second electrode means at such times that the alignment of toner in the recording region is at an optimum for providing toner deposition on the recording medium in response to an electrical force pattern of intelligence on the portion of said toner in physical contact with said recording medium and determined by the electrical potential difference established between said portion of said toner and said second electrode means, said electrical force pattern exerting a force on said portion of said toner which is greater than and in opposition to the force exerted on said portion by said magnetic field.

3,914,772
INK JET TYPE PRINTING DEVICE

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Higashiyamato, Japan

Filed Oct. 25, 1973, Ser. No. 409,722
Claims priority, application Japan, Oct. 27, 1972, 47-107111
Int. Cl.² G01D 15/18
U.S. Cl. 346—75 5 Claims

1. An ink jet type printing device for ejecting ink droplets of substantially uniform size, comprising:
a high voltage generator (20);
a nozzle (11);
means for supplying ink to said nozzle at substantially constant pressure;
means coupled to said high voltage generator and responsive to the high voltage supplied from said high voltage generator for creating an electrostatic force in the vicinity of said nozzle for causing ink particles to be ejected from said nozzle under the influence of said electrostatic force at substantially constant ink pressure so as to record characters, patterns, etc. on a recording medium;
a heat sensitive element (25) disposed adjacent to said nozzle (11) to detect the temperature of the ink supplied

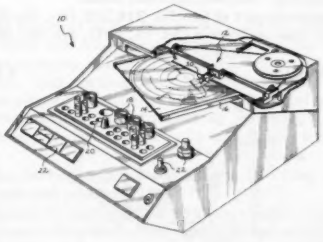


to said nozzle and for generating a detection output; and control means (40) variably controlling the output voltage from the high voltage generator (20) as a function of the detection output of said heat sensitive element (25), which detection output represents the ambient temperature of the ink supplied to said nozzle (11).

3,914,773
RECORDING DEVICE

Harold W. Harrower, Box P, Chepachet, R.I. 02814

Filed Apr. 5, 1974, Ser. No. 458,296
Int. Cl.² G01D 9/14
U.S. Cl. 346—121 4 Claims

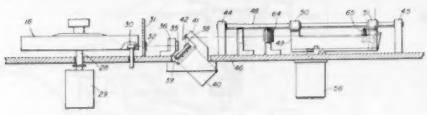


1. A recording device comprising:
rotatable circular chart means having a plurality of circumferentially spaced, radially extending lines which define circumferentially spaced recording time increments and a plurality of radially spaced circumferential lines which define by radial spacing a plurality of recording amplitude increments; means for rotating said rotatable circular chart means at predetermined different rotational speeds which occur in the sequence fast, slow and slower from the commencement of recording; and,
means for producing a recording trace on said circular chart means in response to an input signal during rotation of said chart means whereby rectilinear recording of a time-/amplitude variable signal is provided on said circular chart means.

3,914,774
PHOTO MACHINE WITH ROD AND RACK GUIDED CARRIAGE

Louis E. Griffith, Hampstead, N.H., and Peter R. Ebner, Lowell, Mass., assignors to Graphic Systems, Inc., Hudson, N.H.

Filed May 31, 1974, Ser. No. 475,115
Int. Cl.[2] B41B *13/00*
U.S. Cl. 354—5 2 Claims



1. A photo typesetter comprising a character store having at least one font of characters movable through a display position,

means to generate a short duration flash to illuminate stored characters from said font,

an optical system having an input end and an output end

means to project an image of said illuminated characters to the input end of said optical system,

a movable carriage at the output end of said optical system and means mounted on said carriage to project said character image to a photoreceptor position,

a single guide rail mounted parallel to said photo receptor position

said carriage being mounted on said single rail, rotatable around said rail and slidable along said rail,

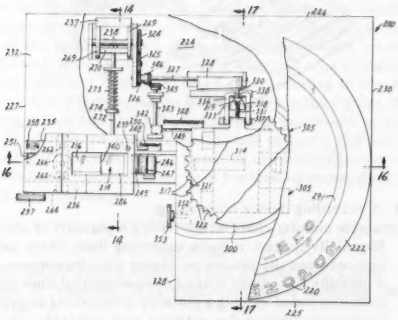
drive means adapted to drive said carriage along said rail, said drive means including a drive member and a driven member, one of which is mounted in said carriage,

means to force load said carriage to maintain said drive member and said driven member into engagement with each other at a predetermined force.

3,914,775
DEVICE FOR FORMING GRAPHICS

Peter J. Vogelgesang, Roseville, and Frank C. Lunquist, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 318,258, Dec. 26, 1972, abandoned. This application Oct. 15, 1973, Ser. No. 406,548
Int. Cl.[2] B41B *17/02*
U.S. Cl. 354—15 9 Claims



1. A device useful for forming graphics such as letters, symbols or pictures on a radiation sensitive material, said device comprising:

means for defining an exposure station;

means adapted for positioning a predetermined portion of a said radiation sensitive material at said exposure station; and

means adapted to be actuated at said exposure station for momentarily irradiating a said radiation sensitive material portion at said exposure station in a sharply defined graphic pattern, including:

a template comprising a thin radiation transparent member with a highly reflective coating less than **0.001** inch thick having at least one sharply defined open area corresponding in shape to a graphic to be formed to provide a radiation transmissive window through said template;

means for mounting said template to register the window at said exposure station with said reflective coating adjacent said radiation sensitive material portion;

clamping means at said exposure station adapted for releasably clamping said template in intimate contact with said radiation sensitive material portion, said clamping means comprising one plate which is essentially transparent to radiant energy positioned to engage said template at said exposure station and positioned to afford visual inspection of said template and said radiation sensitive material portion through said plate;

radiation means for briefly irradiating said radiation sensitive material portion at said exposure station through the transparent plate and aligned window comprising:

a xenon lamp;

means mounting said xenon lamp for movement between a normal position spaced from said exposure station to afford said visible inspection of said template and said radiation sensitive material portion through said plate, and an expose position with said xenon lamp closely adjacent said plate at the exposure station;

means connected to said xenon lamp for providing a power input to said xenon lamp of at least 5 watt seconds per square inch of exposure area in a time duration of about 2 to 3 milliseconds; and

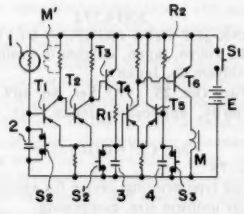
means for operating said means for providing a power input to said xenon lamp to flash said xenon lamp upon movement of the xenon lamp to its expose position; and

means for activating said clamping means to clamp said template in contact with said radiation sensitive material portion upon movement of said xenon lamp to said expose position.

3,914,776
SHUTTER CONTROL DEVICE

Kayoshi Tsujimoto, Osaka; Kintaro Yata, Ikeda; Yoshifusa Fujii, Kaizuka; Hiroshi Ueda, Nara, and Motonobu Matsuda, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

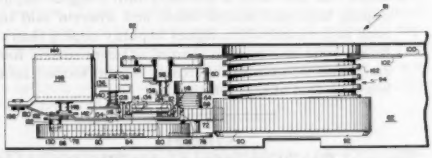
Filed June 11, 1970, Ser. No. 45,378
Claims priority, application Japan, June 17, 1969, 44-48089; Aug. 29, 1969, 44-68754
Int. Cl.[2] G03B *7/08*
U.S. Cl. 354—51 11 Claims



1. A shutter opening and closing device for a photographic camera including a shutter opening mechanism, a shutter closing mechanism, and a light responsive element normally exposed to scene light through an objective lens of the camera and unexposed to the light while said shutter mechanisms are in operating condition, comprising:

a first timing circuit including a first capacitor charged by current generated by said light responsive element;
a switching circuit having an input connected to said first capacitor to be switched when said first capacitor is charged to a predetermined voltage;
a second timing circuit having a second capacitor and controlled by said switching circuit to charge to a voltage determined by said first timing circuit;
a manually operable switch means for initiating the charging of said first and second capacitors simultaneously;
a releasing member manually operable for actuating said switch means and then sequentially releasing said shutter opening mechanism;
a third timing circuit having a third capacitor;
an operating switch connected across said third capacitor and opened in response to the release of said shutter opening mechanism;
means for actuating said shutter closing mechanism;
means for comparing the terminal voltages of said second capacitor and the third capacitor and triggering said means for actuating said shutter closing mechanism when said third capacitor is charged to substantially the same voltage as said second capacitor.

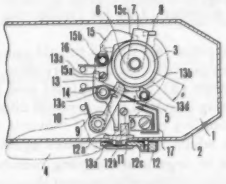
3,914,777
DEPRESSIBLE COUPLING APPARATUS
Frederick Slavitter, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Aug. 30, 1974, Ser. No. 502,014
Int. Cl.² G03B *3/00*
U.S. Cl. 354—196 **17 Claims**



1. An apparatus for calibrating a focusing control system of a photographic camera, comprising:
lens means adjustable to focus an image of a photographic subject positioned a selected distance therefrom at an image plane of the camera;
focusing means mounted for movement to a position corresponding to said selected distance;
means for coupling said focusing means and said lens means whereby said lens means in response to movement of said focusing means is synchronously moved rectilinearly along a locus to travel between distant and nearmost foci to obtain a sharply defined image of the photographic subject at the image plane of the camera; and
means for mounting said coupling means for movement between a first position wherein said coupling means is in engagement with said lens means and said focusing means and a second position wherein said coupling means is out of engagement with one of said lens means and said focusing means and in engagement with the other of said lens means and said focusing means whereby said lens means and said focusing means are independently adjustable relative to each other so as to calibrate the focus of said lens means with the position of said focusing means for said selected distance

17. A method of matching focusing control means with an adjustable lens assembly coupled thereto in a photographic camera by a coupling device adapted to be depressibly disengaged longitudinally along an axis of rotation of said coupling device from one of said focusing control means and said lens assembly whereby said focusing control means and said lens assembly are independently movable to a position corresponding to a selected camera-to-subject distance, said method comprising:
selecting a distant photographic target;
moving said focusing control means to a position whereat said lens assembly coupled thereto is positioned to focus an image of said photographic target along an optical path at an image plane of said photographic camera;
depressing said coupling device to move it out of engagement with one of said focusing control means and said lens assembly while simultaneously maintaining it in engagement with the other of said focusing control means and said lens lens assembly;
moving said focusing control means to a position corresponding to said selected distance thereby calibrating said lens assembly and said focusing means; and
releasing said coupling device for movement into engagement with said focusing control means and said lens assembly.

3,914,778
PHOTOGRAPHIC CAMERA WITH A MECHANICAL SWITCHING SYSTEM
Yoji Sugiura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 23, 1974, Ser. No. 499,999
Claims priority, application Japan, Aug. 29, 1973, 48-101243
Int. Cl.² G03B *17/38*
U.S. Cl. 354—268 **1 Claim**



1. In a camera of the type having a battery supplied exposure meter and having a cocking lever for film winding or shutter charging operation associated with a shutter release member, said cocking lever being displaceable through a certain idle angular distance between a retracted position and a starting position ready for cocking operation, a mechanical switching system cooperative with said cocking lever comprising:
a first locking means for locking said cocking lever in the retracted position;
a switch through which the battery circuit of an exposure meter is operated in response to an operation of said first locking means;
manually switchable means cooperative with said first locking means for setting said switch;
means for biasing said cocking lever toward said starting position; and
second locking means for locking said shutter release member and being arranged to be moved into or away from the path of movement of output means connected to said shutter release member in response to an operation of said manually switchable means;
whereby when said manually switchable means is operated to close said switch, said cocking lever is disengaged from said first locking means, and when said manually switchable means is operated to open said switch, said first locking means is set into a position ready for locking said cocking lever, and simultaneously said second locking means is caused to move into the path of movement of the output means to prevent shutter release operations.

3,914,779
DEVICE FOR MOUNTING AN ACCESSORY DEVICE TO AN ACCESSORY SHOE

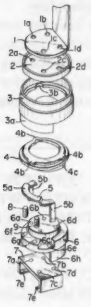
Hiroshi Terunuma, Tokyo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 22, 1974, Ser. No. 516,959

Claims priority, application Japan, Nov. 1, 1973, 48-125870[U]

Int. Cl.² G03B *11/00*

U.S. Cl. 354—295 **10 Claims**



1. Apparatus for mounting an accessory device to an accessory shoe secured to a camera body, comprising:

a connector member (**1,2**) for connecting said accessory device;

a coupling member (**6,7**) fixed to said connector member and engageable with said accessory shoe;

a fixing member (**5**) having at least one leg, said fixing member being disposed between said connector member and said coupling member and movable between a first position in which said leg presses against said camera body so as to urge said coupling member against said accessory shoe during engagement therebetween thereby to fix said connector and coupling members to said camera body, and a second position in which said fixing member releases the pressure force of said coupling member to said accessory shoe; and

an operating member (**3,4**) operative to move said fixing member to either of said first and said second position.

3,914,780
CONTINUOUSLY CONTROLLABLE SEMI-CONDUCTOR POWER COMPONENT

Alois Marek, Nussbaumen, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Feb. 6, 1973, Ser. No. 329,983

Claims priority, application Switzerland, Mar. 27, 1972, 4398/72

Int. Cl.² H01L *29/00*

U.S. Cl. 357—37 **12 Claims**

1. A semiconductor power component the current through which may be controlled in a non-discrete, continuous, and reversible fashion, which comprises:

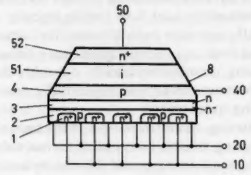
first, second, third, fourth and fifth sequentially positioned semiconductor zones each having a different impurity doping, said first through fourth zones forming a zone sequence of alternating conductivities;

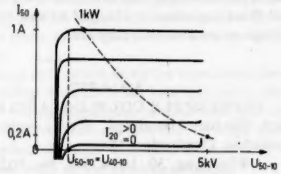
first main terminal means coupled to said first zone;

second main terminal means coupled to said fifth zone which is adapted to be coupled to a first source of potential;

fixed potential terminal means coupled to said fourth zone for connecting said fourth zone to a second source of potential having an absolute magnitude less than or equal to the absolute magnitude of said first source of potential; and

control means coupled to said second zone for continuously varying the magnitude of the current flowing from said first main terminal means to said second main terminal means





wherein said first zone is provided with a higher impurity doping than said second zone, and wherein said third zone is provided with a higher impurity doping than said fourth zone in a portion thereof adjacent to said fourth zone, and wherein the thickness of said second zone is less than that of said fourth zone.

3,914,781
GATE CONTROLLED RECTIFIER

Takeshi Matsushita; Hiroshi Horinaga; Takaji Ohtsu, and Hisao Hayashi, all of Atsugi, Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 243,243, April 12, 1972, abandoned. This application June 28, 1974, Ser. No. 484,311

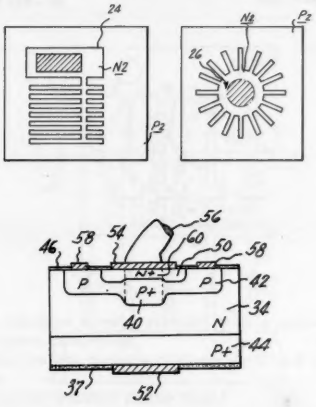
Claims priority, application Japan, Apr. 13, 1971, 46-23301

Int. Cl.² H01L *29/74, 29/90, 29/06*

U.S. Cl. 357—38 **2 Claims**

1. A gate controlled semiconductor switch formed of a semiconductor body having successive, contiguous regions of opposite conductivity type material and being provided with opposite surfaces, said gate controlled semiconductor switch comprising an anode region; a first intermediate region overlying said anode region and defining a first PN junction; a second intermediate region diffused into said first intermediate region and forming a second PN junction; said first and second intermediate regions each having portions that extend to one of said surfaces of said semiconductor body such that said first intermediate region portion surrounds said second intermediate region and said second PN junction extends upward to said one surface and defines a closed line thereat; a select central portion of said second intermediate region being diffused deeper into said first intermediate region than the immediately adjacent surrounding portion thereof; a cathode region diffused from said one surface into said second intermediate region and forming a third PN junction such that said second intermediate region portion surrounds said cathode region, said cathode region being symmetrical with respect to said select central portion of said second intermediate region such that said third PN junction extends upward to said one surface and defines a closed interdigitated line which is circumscribed by said second PN junction, an outer portion of said cathode

region being diffused deeper into said second intermediate region than the adjacent central portion thereof, said cathode region central portion and said select central portion of said second intermediate region being in axial alignment; an anode electrode connected to said anode region; a cathode electrode connected to said cathode region and being in axial alignment



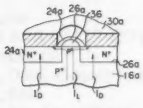
with said cathode region central portion and said select central portion of said second intermediate region; gate electrode means connected to said second intermediate region for supplying turn-on and turn-off control voltages to said gate controlled semiconductor switch; and an insulating layer on said one surface, overlapping said closed line second PN junction on said one surface.

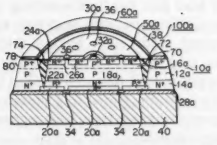
3,914,782

REVERSE CONDUCTING THYRISTOR AND PROCESS FOR PRODUCING THE SAME

Josuke Nakata, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed June 6, 1973, Ser. No. 367,430
Claims priority, application Japan, June 8, 1972, 47-57193
Int. Cl.² H01L 29/74
U.S. Cl. 357—38 **8 Claims**





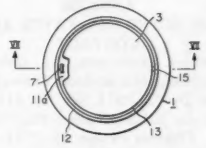
1. A unitary semiconductor device, comprising, in combination, a single supporting member forming one of a pair of main electrodes, a wafer of semiconductor material including a first semiconductor region disposed upon said supporting member and including four superposed semiconductive layers of alternate conductivity to form a reverse conducting thyristor unit, and a second semiconductor region juxtaposed and circumferentially of said first semiconductor region upon said supporting member, said second semiconductor region including two of said semiconductive layers different in conductivity type from each other to form a diode unit, said thyristor unit having an electrode portion disposed on a surface thereof opposite to said supporting member, said diode unit having another electrode portion disposed on said surface thereof opposite to said supporting member, said electrode portion and said another electrode portion being independent of each other but forming together the other main electrode, at least one of said main electrode and said electrode portion of said other main electrode having a plurality of openings therethrough to expose portions of the outermost semiconductive layer of said first semiconductor region adjacent thereto, an intermediate layer of said first semiconductor region adjacent the outermost semiconductive layer partially exposed through said openings having portions extending through the outermost semiconductor layer and exposed through said openings and dimensioned so as to be separated from said main electrode and said electrode portion, said outermost semiconductive layer adjacent the respective one of said main electrode and said electrode portion being doped to form with the adjacent intermediate semiconductive layer adjacent thereto a PN junction having degenerate portions at the portions of said intermediate semiconductive layer extending through said outermost semiconductive layer, and a groove disposed between said thyristor and diode units and of sufficient depth to completely separate said four semiconductive four layers into said first and second semiconductor regions and to separate a P-N junction included in said diode unit away from an intermediate P-N junction included in said thyristor unit through the same.

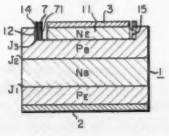
3,914,783

MULTI-LAYER SEMICONDUCTOR DEVICE

Yoshio Terasawa, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Continuation of Ser. No. 293,096, Sept. 28, 1972, abandoned.
This application Dec. 3, 1973, Ser. No. 421,322
Claims priority, application Japan, Oct. 1, 1971, 46-76361
Int. Cl.² H01L 29/74
U.S. Cl. 357—38 **7 Claims**





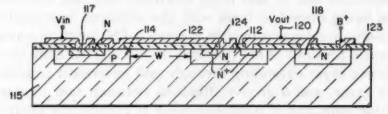
1. A multi-layer semiconductor device comprising a semiconductor body including therein four contiguous layers, adjacent ones of said layers having a conductivity type different from each other, and a pair of main electrodes in low ohmic contact with the uppermost and lowermost layers respectively of said semiconductor body, wherein the uppermost layer in said semiconductor body comprises a main region in contact with said main electrode and an auxiliary region not in contact with said main electrode and electrically isolated from said main region by a groove extending to the adjoining layer of opposite conductivity type, said auxiliary region having a conductor layer disposed exclusively on the surface thereof, a small region of the same conductivity type as that of said uppermost layer being provided between said main region and said auxiliary region at a spot along the boundary therebetween to thereby connect said main region with said auxiliary region, wherein an intermediate region of a conduc-

tivity type opposite to that of said adjoining layer and connected with said adjoining layer but isolated from said main and auxiliary regions is provided in said groove at a place remote from said small region and a control electrode is attached to said intermediate region.

3,914,784
ION IMPLANTED GALLIUM ARSENIDE SEMICONDUCTOR DEVICES FABRICATED IN SEMI-INSULATING GALLIUM ARSENIDE SUBSTRATES

Robert G. Hunsperger, Malibu, and Nathan Hirsch, Santa Monica, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Dec. 10, 1973, Ser. No. 423,325
Int. Cl.² H01L *29/48, 29/161, 29/167*
U.S. Cl. 357—61 **8 Claims**

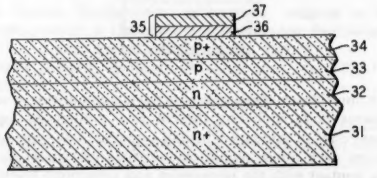


1. A GaAs wafer comprising a GaAs semi-insulating substrate with a bulk resistivity between 10^6 and 10^8 ohm centimeters and having a thin ion implanted surface region therein, said region formed in a surface portion of said substrate and having a uniform thickness of about 0.2 micrometers or less over a predetermined area of said substrate, said ion implanted region characterized by an impurity concentration of at least 10^{17} carriers per cubic centimeter beginning at or closely adjacent the surface of said ion implanted region and extending over at least one half of its said thickness, and said ion implanted region further characterized by carrier mobilities therein in excess of 3000 cm^2/volt.second.

3,914,785
GERMANIUM DOPED GaAs LAYER AS AN OHMIC CONTACT

Doris Rahb Ketchow, Kenilworth, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 3, 1973, Ser. No. 421,026
Disclosure was also published under Trial Voluntary Protest Program on Jan. 28, 1975.
Int. Cl.² H01L *29/167, 29/207, 29/227, 33/19*
U.S. Cl. 357—63 **6 Claims**

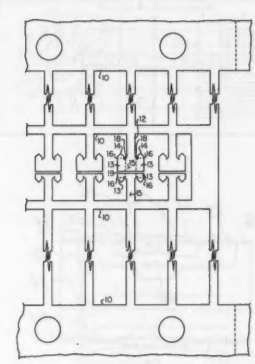


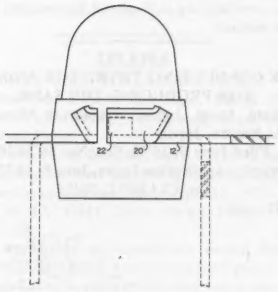
1. A semiconductor device comprising a body of Group III–V compound semiconductor material, including an epitaxial surface layer of p-type GaAs which surface layer includes Ge as the principal conductivity determining dopant and a metallic body in contact with the surface layer characterized in that the Ge is included in sufficient quantity to provide a carrier concentration of at least 3.5×10^{19} p-type carriers per cubic centimeter, and in which device the blocking voltage between the surface layer and the metallic body is less than 50 millivolts.

3,914,786
IN-LINE REFLECTIVE LEAD-PAIR FOR LIGHT-EMITTING DIODES

Brian John Grossi, Cupertino, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 19, 1974, Ser. No. 462,285
Int. Cl.² H01L *23/48, 33/00, 23/30, 9/00*
U.S. Cl. 357—68 **7 Claims**





1. An in-line lead pair for light-emitting diodes having improved luminous efficiency, said lead pair comprising:

first and second leads each having thickness and width dimensions, said thickness dimension being less than said width dimension, said first and second leads further having lateral extensions projecting therefrom, and said first lead being spaced apart from said second lead by a preselected distance; and

said first lead having a mounting area in a plane determined by the width dimension and the longitudinal axis of the lead pair for mounting at least one light-emitting diode chip thereon;

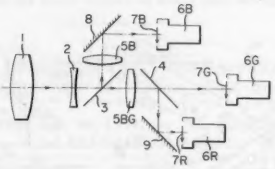
said mounting area having a reflector formed by bending the lateral extensions of said first and second leads along a line essentially parallel to the longitudinal axis thereof and towards said mounting area to reflect non-axially emitted light from said diode chip along an axis orthogonal to said mounting area.

3,914,787

COLOR TELEVISION CAMERA WITH A COLOR-RESOLVING OPTICAL SYSTEM

Takeshi Sekiguchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 8, 1974, Ser. No. 440,735
Claims priority, application Japan, Feb. 16, 1973, 48-18306
Int. Cl.² H04N *9/09*
U.S. Cl. 358—50 **2 Claims**



1. A television camera provided with a color-resolving optical system comprising:

an objective lens having a relatively short back focus portion;

first, second and third pickup tubes;

a diverging lens disposed in the back-focus portion of said objective lens;

a first color-separating filter disposed in the path of light from said diverging lens to separate the light from said diverging lens into a light beam including one color component light and another light beam including the other two color component lights;

a first converging lens disposed in the path of said light beam including said one color component light from said first filter to form a first image on said first pickup tube; a second converging lens disposed in the path of said light beam including said other two color component lights from said second filter; and

a second color-separating filter disposed in the back-focus portion of said second converging lens to separate the light beam from said second converging lens into two monochromatic component lights and direct them to said second and third pickup tubes, respectively.

3,914,788

METHOD AND APPARATUS FOR RECONSTITUTING COLOR IMAGES

William R. Niehaus, Cincinnati, Ohio, assignor to The E. W. Scripps Company, Cincinnati, Ohio

Filed Mar. 12, 1974, Ser. No. 450,445
Int. Cl.² H04N *1/02*
U.S. Cl. 358—75 **18 Claims**

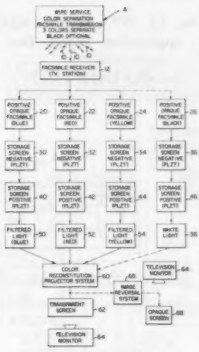
4. A method of creating a color reconstituted image on a planar surface and corresponding to a selected color image, said method including the following steps:

a. providing for each of three basic colors a flat transparent screen formed from a layer of material capable of forming an image therein when exposed to a light image while an electro-magnetic field is created within said layer;

b. forming a two-tone image in each of said screens with the image of each screen corresponding to the pattern of a basic color in said selected color image;

c. directing a light source of one of said basic colors through each of said transparent screens, with said basic color corresponding to the basic color of the image of each of said screens and thus producing at least three basic color light ray images corresponding to the basic colors of said selected color image;

d. focusing said light ray images simultaneously onto said planar surface; and,



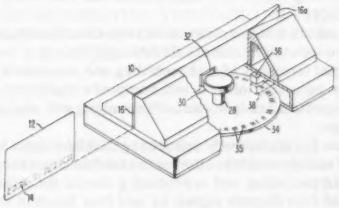
e. adjusting the positions of said light ray images for registering said light ray images on said planar surface.

3,914,789

MANUALLY OPERATED MAGNETIC CARD ENCODER

Charles Walter Coker, Jr.; Thomas A. Hickox; John Joseph Lynott, all of Los Gatos, and Thomas Frank O'Rourke, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1973, Ser. No. 416,910
Int. Cl.² G06K *7/016;* **G11B** *15/18*
U.S. Cl. 360—2 **6 Claims**



1. Apparatus for magnetically recording binary data from a register at a constant density on a magnetizable surface of a record member, said apparatus comprising: housing means defining a slot into and through which the member is linearly manually advanced at a non-constant acceleration during a series of recording operations,

a capstan disposed at one side of the slot and frictionally rotatablty driven by the member at a variable speed directly proportional to the instantaneous lineal speed of the member,

pulse generator means including a disk coaxially connected to the capstan for rotation thereby and means cooperative with said disk for supplying clocking signals to said register at a frequency which varies according to the rotational speed of the capstan, and

a transducer disposed within said slot and connected to the register to effect recording of data from the register onto the surface in response to said clocking signals,

whereby binary data will be recorded on the member at constant density irrespective of variations in the speed at which the member is linearly advanced.

3,914,790
FOUR-CHANNEL STEREO APPARATUS FOR SWITCHING BETWEEN TWO CHANNEL AND FOUR CHANNEL INPUTS

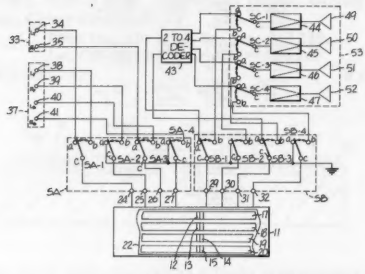
Shojiro Shimada, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 13, 1973, Ser. No. 424,306

Claims priority, application Japan, Dec. 29, 1972, 48-3987[U]

Int. Cl.² G11B 15/12

U.S. Cl. 360—63 **6 Claims**



1. A sound reproducing apparatus comprising:

a first input device having two input terminals for supplying two respective composite signals which together constitute a matrixed four-channel signal;

a second input device having four input terminals for supplying four respective discrete signals;

a magnetic tape recording and reproducing device including a magnetic tape, four magnetic heads for recording and reproducing signals in respective tracks on said tape, four input terminals for applying signals to be recorded to said four heads, respectively, and four output terminals for deriving reproduced signals from said four heads, respectively;

first switch means operative for respectively connecting said two input terminals of said first input device to two of said input terminals of said recording and reproducing device for recording of said two composite signals by the two respective heads in the corresponding two tracks on said tape;

means for respectively connecting said four input terminals of said second input device to said four input terminals of said recording and reproducing device for recording of said four discrete signals by said four heads in the corresponding tracks on said tape;

four sound reproducing means;

two-channel to four-channel decoding means having two input terminals and four output terminals and being operative to provide four decoded discrete signals at said four output terminals, respectively, of said decoding means upon the reception of said two composite signals at said two input terminals, respectively, of the decoding means;

second switch means having a first position, in which the two output terminals of said recording and reproducing device which correspond to said two heads are respectively connected to said two input terminals of the decoding means for supplying said two composite signals, as reproduced by said two heads, to said decoding means, and a second position, in which said four output terminals of the recording and reproducing device are connected to four respective conductors;

and third switch means having a first position, in which said four output terminals of said decoding means are respectively connected to said four sound reproducing means for operation of the latter by said four decoded discrete signals, and a second position, in which said four conductors are respectively connected to said four sound reproducing means for operation of the latter by said four discrete signals as reproduced by said four heads.

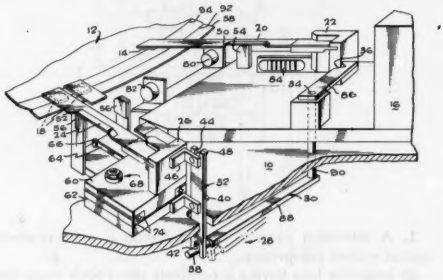
3,914,791
MEMORY UNIT FLYING PAD LINKAGE

Robert F. Stebe, Thousand Oaks, Calif., assignor to VRC California, Inc., El Segundo, Calif.

Filed Jan. 28, 1974, Ser. No. 437,181

Int. Cl.² G11B 5/60, 5/54, 21/12

U.S. Cl. 360—103 **9 Claims**



1. In an information storage system in which a medium is movable with respect to a plurality of flying pads, the combination therewith comprising:

first head mount means coupled to a base for positioning a first flying pad means over a first portion of the medium;

second head mount means coupled to the base spatially separated from the first means for positioning a second flying pad means over a second portion of the medium; and

means providing a motion relative to the first head mount means for causing a lateral motion of the second head mount means in response to a lateral travel of the first head mount means.

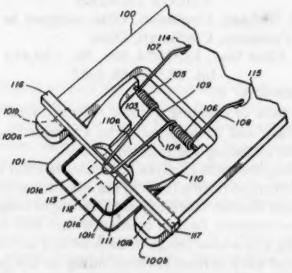
3,914,792
FLEXIBLE PAD LOAD COUPLING

Harold James Beecroft, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Nov. 25, 1974, Ser. No. 526,554

Int. Cl.² G11B 5/60, 5/48

U.S. Cl. 360—103 **5 Claims**



1. In data transcribing apparatus comprising a head pad carrying a transducing head and having a load point opposite its flying surface at which force counteracting hydrodynamic lift is applied, a pad support arm, a pad mounting element attaching the pad to the support arm and weakly restricting

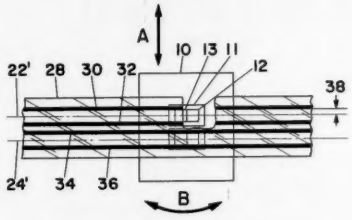
the head to motion along a preselected straight line approximately normal to the flying surface, and a spring loaded head loading arm rotatably attached to the support arm and extending adjacent the load point, improved apparatus for transferring the head loading arm force to the load point without application of force to the head causing deviation from said straight line head motion, comprising an intermediate arm rotatably attached to the support arm and a resilient strip interposed on edge between the head loading arm and the load point and attached at its ends to the intermediate arm, the middle portion of the strip deflecting torsionally with respect to its ends as the head translates along said straight line.

3,914,793

TAPE RECORDER ALIGNMENT APPARATUS

William W. Burnham, 452 Latham Road, Mineola, N.Y. 11501

Filed Apr. 30, 1974, Ser. No. 465,623
Int. Cl.[2] G11B *23/38, 5/62*
U.S. Cl. 360—134 **9 Claims**



1. In a system for recording and playing back recorded signals on a magnetic tape of a selected width, wherein said tape is mechanically transported with respect to recording or detecting transducers and wherein said signals are represented by the magnetic state of at least one longitudinally disposed recording track on said magnetic tape, apparatus for aligning said transducers with said recording track, comprising:

a flexible transparent tape, having a width substantially equal to the width of said magnetic tape;

and at least one longitudinally disposed visible marking on said tape, said marking having a selected transverse displacement from a longitudinal line on said tape corresponding to the center-line of one of the recording tracks on said magnetic tape.

3,914,794

TRAINING SIMULATOR FOR NUCLEAR POWER PLANT REACTOR CONTROL MODEL AND METHOD

Francis R. Czerniejewski, Glenshaw, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

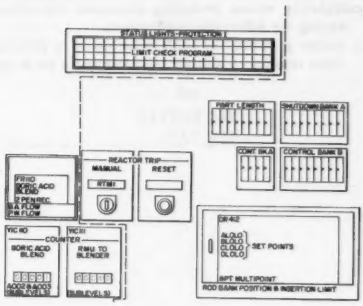
Filed Feb. 23, 1973, Ser. No. 335,288
Int. Cl. G06f *15/06, 15/56;* **G09b** *9/00*
U.S. Cl. 444—1 **18 Claims**

1. An automated training simulator for the real-time dynamic operation of a nuclear reactor, said nuclear reactor being controlled by movable rods having remote control means operable to raise and lower the rods discrete incremental distances during variable successive time intervals with each incremental distance of rod travel being indicated at the remote control location; said simulator comprising:

command means for generating signals corresponding to desired rod motion;

calculating means operative to generate output data repetitively at fixed time intervals,

said calculating means including sequence controlling means having the following components (a) means governed by the operation of the command means to generate at each fixed predetermined time interval a data value relating to the fractional parts of said fixed time interval in accordance with distance and speed of rod movement as required by the command means,



b. means governed by the data value relating to the fractional time generated during each said fixed time interval to generate an output signal at times representative of the incremental distance of rod travel; and

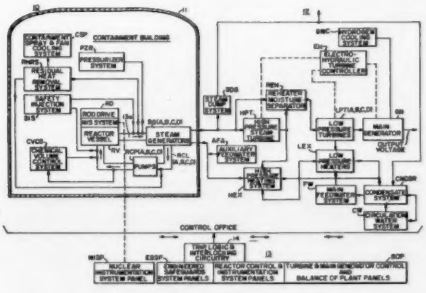
indicating means responsive to each generated output signal to indicate rod travel through each incremental distance.

3,914,795

FLUID DISTRIBUTION NETWORK AND STEAM GENERATORS AND METHOD FOR NUCLEAR POWER PLANT TRAINING SIMULATOR

William H. Alliston, Murrysville; Steven J. Johnson, McKnight Road, and Boris A. Mutafelija, Allison Park, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 23, 1973, Ser. No. 335,391
Int. Cl. G06f *15/06, 15/56;* **G06b** *9/00*
U.S. Cl. 444—1 **19 Claims**



1. An automated training simulator for the real-time dynamic operation of a power plant; comprising

a plurality of command devices corresponding to representative fluid control actuating devices of a representative fluid distribution system;

means responsive to the operation of the command devices to generate an input signal relating to the operation of each representative fluid control device;

calculating means including sequence controlling means having the following components

a. means governed by each input signal to generate a data value relating to a linear admittance for each representative fluid control device in accordance with data values relating to flow and pressure for spaced locations of the representative fluid system,

b. means governed by data values including the generated linear admittance data values to generate data values relating to flow and pressure for each said spaced location of the representative fluid system; and

indicating devices responsive to the generated data values relating to flow and pressure to monitor the physical values in the representative fluid system.

DESIGN PATENTS

GRANTED OCTOBER 21, 1975

ERRATA

For CLASS	See PATENT NO.
025–072	237,272

DESIGNS

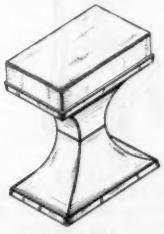
OCTOBER 21, 1975

237,223
APRON
Doris Brosk, 150 E. 69th St., New York, N.Y. 10021
Filed Sept. 17, 1973, Ser. No. 397,859
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—227

237,224
SHOE
Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.
Filed Mar. 29, 1973, Ser. No. 345,902
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—313

237,225
BRUSH
Evan R. Kahn, 868 NE. 160th Terrace, North Miami Beach, Fla. 33162
Filed Jan. 16, 1974, Ser. No. 433,850
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—31

237,226
STOOL
Manus Mudde, Berkel-Enschot, Netherlands, assignor to Dart Industries Inc., Los Angeles, Calif.
Original design application Jan. 22, 1973, Ser. No. 325,916, now abandoned. Divided and this application Sept. 16, 1974, Ser. No. 506,471
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26

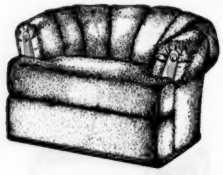


237,227
CHAIR
George Mergenov, Closter, N.J., assignor to Mohasco Industries Inc., Amsterdam, N.Y.
Filed May 2, 1974, Ser. No. 466,435
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—37

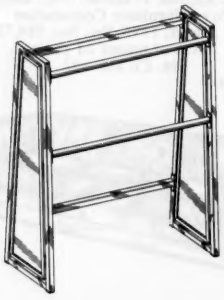
237,228
FURNITURE SEAT
Burton H. Kaplan, Potomac, Md., assignor to Rowe Furniture Corporation
Filed June 9, 1975, Ser. No. 584,724
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63

237,229
MOULDED CHAIR
Harry Sebel, 23 Yarranabbe Road, Darling Point, New South Wales 2027; Dillon Charles Furey, 42 Wellman Road, Forestville, New South Wales 2087; and Maxwell Granger, 132 Duntroon St., Hurlstone Park, New South Wales, all of Australia
Filed June 22, 1973, Ser. No. 353,669
Claims priority, application Australia Jan. 19, 1973
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66

237,230
CHAIR
Burton H. Kaplan, Potomac, Md., assignor to Rowe Furniture Corporation
Filed June 9, 1975, Ser. No. 584,863
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—71

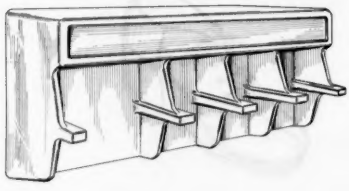


237,231
MERCHANDISE DISPLAY RACK
Charles A. Wells, Coshocton, Ohio, assignor to Pretty Products, Inc., Coshocton, Ohio
Filed June 12, 1973, Ser. No. 369,266
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—85

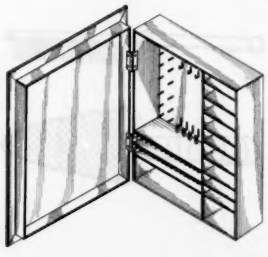


237,232
CONTAINER FOR A PLURALITY OF VERTICALLY STACKED TOILET TISSUE ROLLS
Ralph F. Garrett, Jr., 116 Ash Ave., Troutdale, Oreg. 97060
Filed June 10, 1974, Ser. No. 477,782
Term of patent 7 years
Int. Cl. D23—*02*
U.S. Cl. D6—97

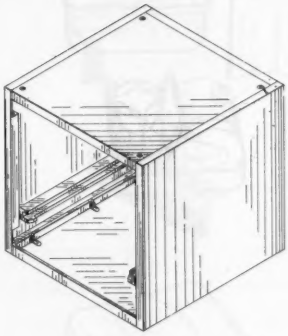
237,233
DISPLAY RACK FOR MERCHANDISE
Robert C. Barry, Newtown Square, Pa., assignor to Cooper Industries, Inc., Houston, Tex.
Filed Oct. 23, 1973, Ser. No. 408,613
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—114



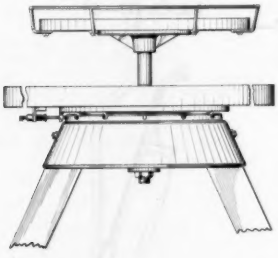
237,234
WALL MOUNTED JEWELRY BOX
Betty Jay Wertz, Owasso, Okla. (412 S. Wyandotte, Bartlesville, Okla. 74003)
Filed Sept. 8, 1972, Ser. No. 287,502
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127



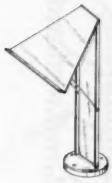
237,235
CABINET OR SIMILAR ARTICLE
John D. Iacurto, Pittsburgh, and Marvin S. Levine, Monroeville, Pa., assignors to United States Steel Corporation
Filed Dec. 15, 1972, Ser. No. 315,743
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—167



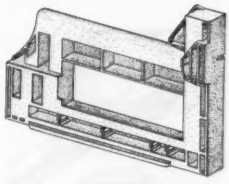
237,236
TABLE
Edward L. Green, 8925 Jackson Road, Dexter, Mich. 48130
Filed Feb. 16, 1973, Ser. No. 333,492
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—179



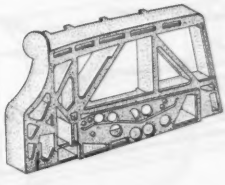
237,237
BOOK HOLDER
Madeline Nelson, 203 Jefferson St., Rockwell, Iowa 50469
Filed Sept. 14, 1973, Ser. No. 397,600
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—184



237,238
FURNITURE SUBFRAME
William R. Curtis, New Castle, and David C. Trimble, Yorklyn, Del., assignors to Hercules Incorporated, Wilmington, Del.
Filed Mar. 28, 1974, Ser. No. 455,773
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



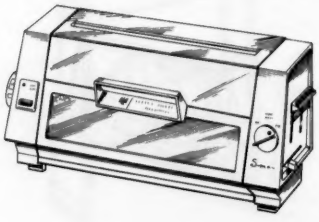
237,239
FURNITURE SUBFRAME
William R. Curtis, New Castle, and David C. Trimble, Yorklyn, Del., assignors to Hercules Incorporated, Wilmington, Del.
Original design application Mar. 28, 1974, Ser. No. 455,773. Divided and this application Sept. 17, 1974, Ser. No. 506,675
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



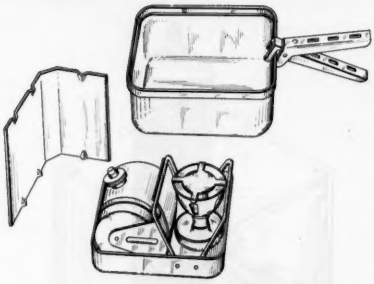
237,240
PICTURE HOLDER
Daniel Paez, 5674 Buchanan, Los Angeles, Calif. 90042
Filed Mar. 25, 1974, Ser. No. 454,401
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234

237,241
INSULATED PITCHER
John S. Cummings, Nashville, Tenn., assignor to Aladdin Industries, Incorporated, Chicago, Ill.
Filed Feb. 25, 1974, Ser. No. 445,056
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—64

237,242
TOASTER-OVEN
Bruce A. Claxton, Springfield, Pa., assignor to SCM Corporation, New York, N.Y.
Filed Apr. 24, 1974, Ser. No. 463,699
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—93



237,243
PORTABLE, SELF-CONTAINED COOKING SET
John Erik Faldt, Vasby, Sweden, assignor to AB Optimus, Vasby, Sweden
Filed Sept. 10, 1973, Ser. No. 395,414
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7- -107



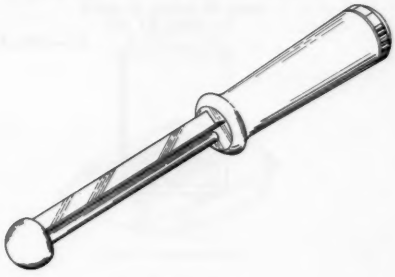
237,244
UPRIGHT VACUUM CLEANER OR SIMILAR ARTICLE
Clyde H. Williams, Coldwater, Mich., assignor to The Scott & Fetzer Company, Bronson, Mich.
Filed May 28, 1974, Ser. No. 473,755
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—165

237,245
COMBINATION RAKE AND BROOM
Donald Nation Smyth, 5 Taylor Court, South Plympton, South Australia, Australia 5038
Filed Feb. 21, 1973, Ser. No. 334,406
Claims priority, application Australia Aug. 31, 1972
Term of patent 14 years
Int. Cl. D8—*05*; D4—*01*
U.S. Cl. D8—6

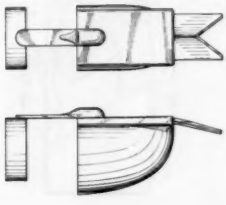
237,246
TOOL USED IN FITTING A TIRE TO A WHEEL
John Anthony Holdsworth, Redditch, England, assignor to Dunlop Limited
Filed Dec. 5, 1973, Ser. No. 421,811
Claims priority, application Great Britain June 15, 1973
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—31

237,247
PICK UP TOOL
Raymond B. Nockleby, Rte. 1, Kalispell, Mont. 59901
Filed Apr. 18, 1974, Ser. No. 461,988
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—52

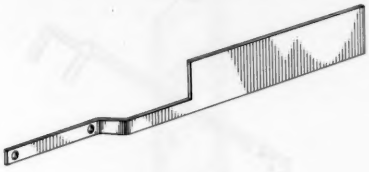
237,248
CHAIN-SAW SHARPENING TOOL
Richard T. Santore, Ansonia, Conn., assignor to High Precision Incorporated, Hamden, Conn.
Filed Apr. 25, 1974, Ser. No. 464,221
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—91



237,249
THUMB KNIFE
Lester J. Gendron, P.O. Box 1177, Madera, Calif. 93637
Filed Jan. 17, 1974, Ser. No. 435,012
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—98

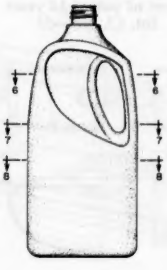


237,250
BUMPER STICKER HOLDER
Melvin E. Clark, 3025 E. Belleview, Phoenix, Ariz. 85008
Filed Jan. 2, 1974, Ser. No. 430,188
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—243

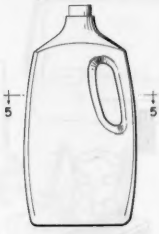


237,251
BOTTLE
James E. Plummer, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Jan. 7, 1974, Ser. No. 431,374
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—28

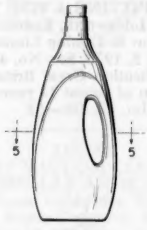
237,252
BOTTLE OR SIMILAR ARTICLE
John C. Armbruster, Independence, and John W. McDonald, Kansas City, Mo., assignors to Ethyl Development Corporation, Kansas City, Mo.
Filed Mar. 11, 1974, Ser. No. 449,952
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—40



237,253
JUG
Peter L. Schweizer, Liberty Center, Ohio, assignor to Owens-Illinois, Inc.
Filed Jan. 7, 1974, Ser. No. 431,283
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—42

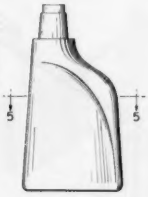


237,254
JUG
Edward J. Kretz, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Jan. 16, 1974, Ser. No. 433,816
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—42



237,255
JUG
James E. Plummer, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Jan. 16, 1974, Ser. No. 433,817
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—52

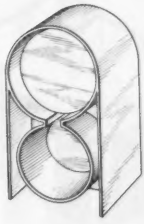
237,256
BOTTLE
Richard L. Weckman, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Feb. 11, 1974, Ser. No. 441,211
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—60



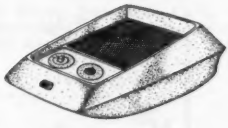
237,257
BOTTLE
Peter L. Schweizer, Liberty Center, Ohio, assignor to Owens-Illinois, Inc.
Filed Feb. 11, 1974, Ser. No. 441,488
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—142

237,258
PACKAGING CONTAINER FOR FOOD PRODUCTS
Sam A. Mazzola, 1852 Rural St., Rockford, Ill. 61107, and William J. Duncan, Jr., R.R. 2, Bemes Road, Crete, Ill. 60417
Filed Mar. 31, 1972, Ser. No. 240,329
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—219

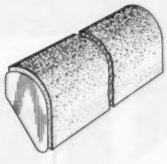
237,259
PENDULUM CLOCK HOUSING
Ronald B. Kemnitzer, Lisle, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed July 9, 1973, Ser. No. 377,464
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—28



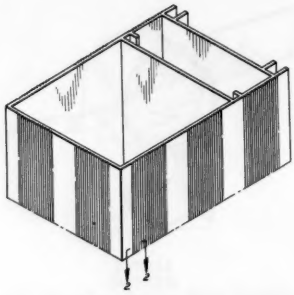
237,260
ELECTRONIC STOP WATCH
John H. Innes and Steven D. Charles, San Jose, Calif., assignors to Intersil Inc., Cupertino, Calif.
Filed Sept. 10, 1973, Ser. No. 395,924
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—30



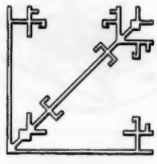
237,261
BALANCE WEIGHT
Roger Stanley Mallett, Sutton Coldfield, England, assignor to Dunlop Limited, London, England
Filed Oct. 26, 1973, Ser. No. 409,933
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—94



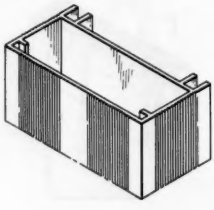
237,262
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,370
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



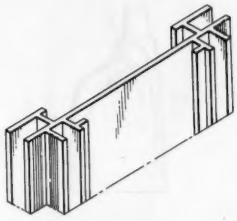
237,263
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,371
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



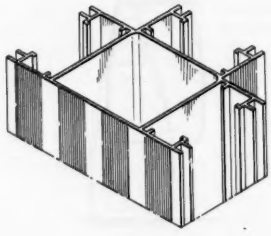
237,264
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,372
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



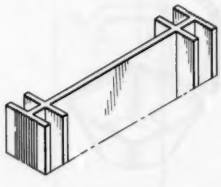
237,265
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,373
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



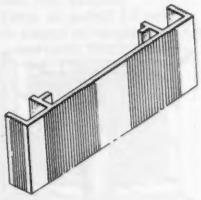
237,266
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,374
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



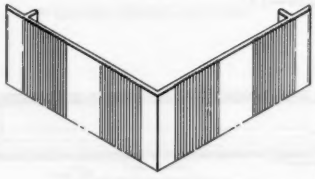
237,267
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,375
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



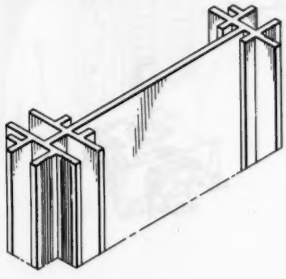
237,268
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,376
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



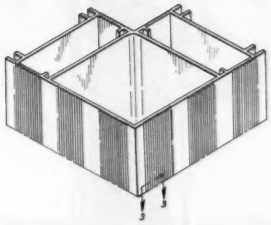
237,269
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,377
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



237,270
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,378
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H

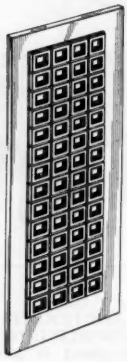


237,271
EXTRUDED STRUCTURAL ELEMENT FOR BUILDINGS
Lindell N. Edwards, St. Louis, Mo., assignor to Universal Modular Structures, Inc., St. Louis, Mo.
Filed Feb. 14, 1972, Ser. No. 226,396
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



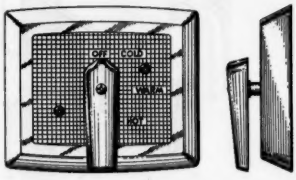
237,272
WINDOW PANE
Robert A. Keyes, Inglewood, Calif., assignor to LeVan Specialty Company, Inc., Industry, Calif.
Filed Apr. 24, 1973, Ser. No. 354,015
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D25—72

237,273
DOOR
Frederick V. Caropresi, Pittsburgh, Pa., assignor to Pease Company, Fairfield, Ohio
Filed July 23, 1973, Ser. No. 381,799
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D13—1 M

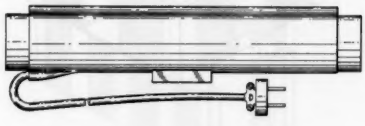


237,274
SWIMMING LURE BODY
William O. Roberts, 421 Laurel St., Apt. #29, Lufkin, Tex. 75901, and Robert Glynn Carver, P.O. Box 598, Minden, La. 71055
Filed Feb. 16, 1974, Ser. No. 442,349
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—27

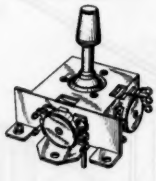
237,275
COMBINED WALL PLATE AND HANDLE FOR SHOWER VALVE
Harper Landell, Fort Washington, Pa., assignor to Speakman Company
Filed June 25, 1974, Ser. No. 482,992
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—31



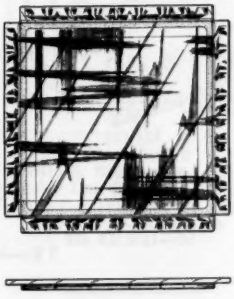
237,276
ELECTRICAL CABLE SPLICING MOLD
Manuel Filreis, Minneapolis, Minn., assignor to Minnesota Mining & Manufacturing Company, St. Paul, Minn.
Filed Mar. 26, 1974, Ser. No. 454,802
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 C



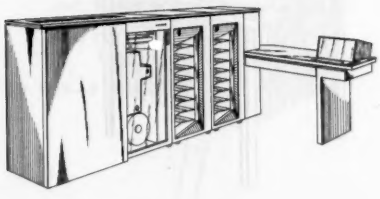
237,277
VARIABLE RESISTOR
Shunzo Oka, Hirakata, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd.
Filed July 5, 1972, Ser. No. 269,251
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 D



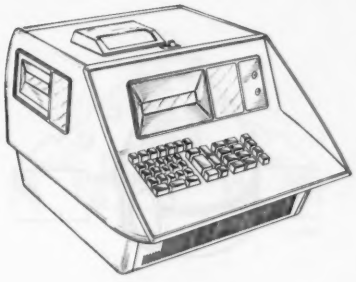
237,278
LIGHT EMITTING GAS DISCHARGE MATRIX DISPLAY PANEL
Richard A. Martel, Toledo, Ohio, Fred E. Mansur, Temperance, Mich., and Larry J. Lohmann, Centerville, and Gerald E. Wojcik, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio
Continuation-in-part of design application Ser. No. 26,325, Dec. 7, 1970, now Patent No. 231,359. This application Dec. 14, 1973, Ser. No. 425,050
Term of patent 14 years
The term of this patent subsequent to Apr. 16, 1988, has been disclaimed
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



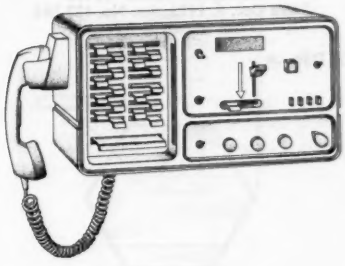
237,279
PRINTER OR SIMILAR ARTICLE
George R. Daniels, Oklahoma City, Okla., and John F. Graham, Sudbury, Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.
Filed Jan. 7, 1974, Ser. No. 431,515
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



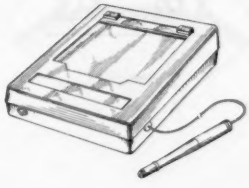
237,280
DATA TERMINAL
Toshihiko Sakow, Teaneck, N.J., assignor to Litton Business Systems, Inc.
Filed Oct. 2, 1974, Ser. No. 511,186
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



237,281
RADIO TELEPHONE REMOTE CONTROL UNIT
Douglas M. Spranger and Malcom J. Brookes, New York, N.Y., assignors to International Telephone and Telegraph Corporation
Filed Dec. 26, 1973, Ser. No. 427,964
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A

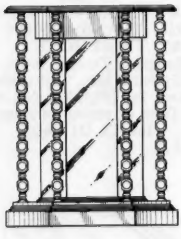


237,282
CABINET FOR HOUSING APPARATUS PERMITTING THE TRANSMISSION OF WRITTEN MATERIAL BY TELEPHONE
James L. Rodgers, Tempe, Ariz., assignor to Talos Systems, Inc., Scottsdale, Ariz.
Filed Dec. 26, 1973, Ser. No. 428,365
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 R

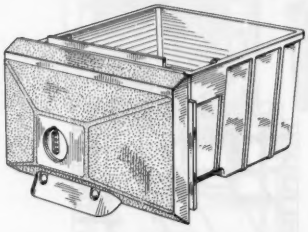


237,283
DOG HOUSE
Alan A. Evans, Toledo, Ohio, assignor to Capitol Plastics of Ohio, Inc., Bowling Green, Ohio
Filed May 16, 1974, Ser. No. 470,659
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—1

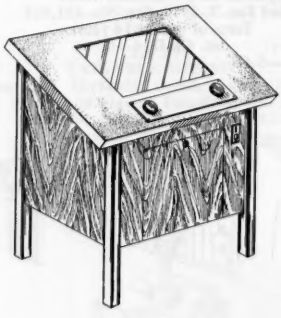
237,284
COMBINED TABLE AND AQUARIUM
Wayne E. Mertz, 4207 Gerard Ave. N., Minneapolis, Minn. 55412
Filed Dec. 6, 1973, Ser. No. 422,363
Term of patent 7 years
Int. Cl. D30—*02*
U.S. Cl. D30—9



237,285
COIN VAULT
Kalju Helenurm, Willowdale, Ontario, Canada, assignor to Jonathan Lock Limited
Filed Jan. 29, 1973, Ser. No. 327,293
Term of patent 3½ years
Int. Cl. D31—*00*
U.S. Cl. D31—23



237,286
CONSOLE FOR TELEVISION GAMES
Harold R. Miller, Phoenix, Ariz., assignor to Western Woodcraft Company, Inc., Phoenix, Ariz.
Filed Dec. 5, 1973, Ser. No. 422,067
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

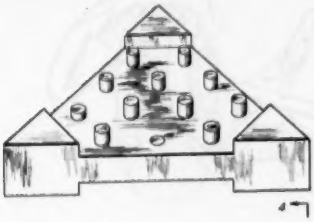


237,287
TOY MOBILE
Ralph W. Crawford, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Dec. 5, 1973, Ser. No. 421,774
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 F

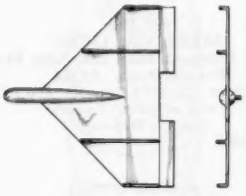
237,288
TOY MOBILE
Ralph W. Crawford, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Dec. 5, 1973, Ser. No. 421,776
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 F

237,289
GOLF PUTTER HEAD
Jack R. Calton, 1115 Brooklyn Ave., Salt Lake City, Utah 84104
Filed Dec. 5, 1973, Ser. No. 421,757
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

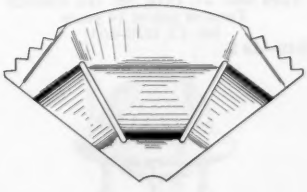
237,290
GAME BOARD
Piet Hein, Heather Field, Park Road, Stoke Poges, Buckinghamshire, England
Filed Sept. 24, 1973, Ser. No. 400,021
Claims priority, application Denmark Mar. 23, 1973
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



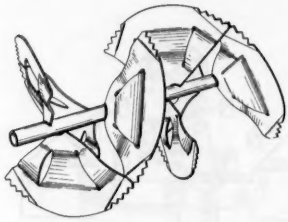
237,291
TOY AIRPLANE
Hans J. Meffert, Michelet 43-7, Mexico City 5, Mexico
Filed Jan. 3, 1974, Ser. No. 430,468
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 HH

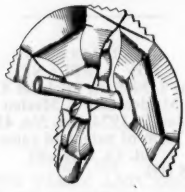


237,292
AUGER BLADE USABLE TO MOVE MATERIALS SUCH AS SNOW AND THE LIKE
Walter Franklin Ruhl, Greenville, Ohio, assignor to Lambert Corporation, Dayton, Ohio
Filed Apr. 12, 1974, Ser. No. 461,020
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D35—2 B

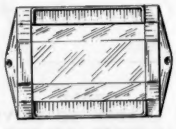


237,293
AUGER USABLE TO MOVE MATERIALS SUCH AS SNOW AND THE LIKE
Walter Franklin Ruhl, Greenville, Ohio, assignor to Lambert Corporation, Dayton, Ohio
Filed Apr. 12, 1974, Ser. No. 461,021
Term of patent 14 years
Int. Cl. D8—*05;* D12—*13*
U.S. Cl. D35—2 B

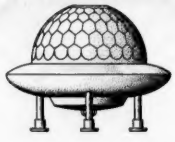




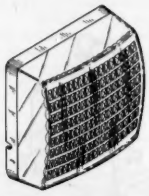
237,294
DARKROOM LIGHT
Ellis H. Robinson, Bldg. 328, Paine Field, Everett, Wash. 98204
Filed Mar. 13, 1974, Ser. No. 450,857
Term of patent 7 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



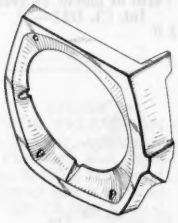
237,295
NOVELTY DISPLAY LAMP
Vincent B. Ream, 5906 Rodman St., Hollywood, Fla. 33023
Filed Sept. 27, 1974, Ser. No. 510,023
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D48—20 E



237,296
VEHICLE LAMP
Bernard R. Weber, Elm Grove, Wis., assignor to Wesbar Corporation, West Bend, Wis.
Filed June 21, 1973, Ser. No. 372,025
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 R



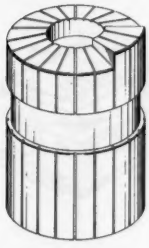
237,297
AUTOMOTIVE HEADLIGHT RETAINER
Frank Y. Soliman, Morristown, Albert H. Steinberg, Morris Plains, and Robert E. Phillips, Plainfield, N.J., assignors to Allied Chemical Corporation, New York, N.Y.
Filed Oct. 31, 1974, Ser. No. 519,882
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 B



237,298
COMPONENT FOR GRILLWORK, RAILINGS AND COLUMNS
Ellis De Loy Larson, 225 E. State Road, Pleasant Grove, Utah 84062
Filed Jan. 28, 1974, Ser. No. 437,293
Term of patent 14 years
Int. Cl. D25—*02*
U.S. Cl. D54—2 B

237,299
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,162
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B

237,300
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,164
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B



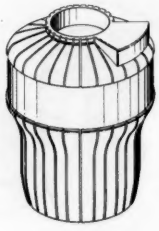
237,301
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,163
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B

237,302
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,353
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B

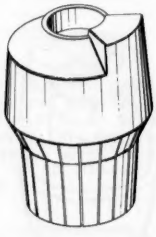
237,303
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,356
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B

237,304
COVER FOR A FOOD WASTE DISPOSER
Robert J. Bledsoe, Finchville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,359
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B

237,305
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 1, 1972, Ser. No. 311,362
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B



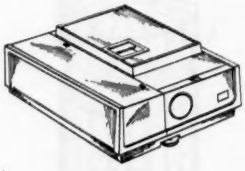
237,306
COVER FOR A FOOD WASTE DISPOSER
Walter C. Pitts, Louisville, Ky., assignor to General Electric Company
Filed Dec. 6, 1972, Ser. No. 311,594
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D55—1 B



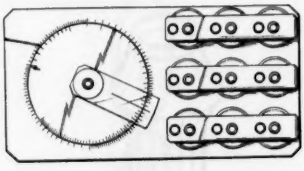
237,307
RADIO RECEIVER
Masaaki Miyamoto, Moriguchi, and Hironosuke Koda, Kyoto, Japan, assignors to Matsushita Electric Industrial Co.
Filed Nov. 8, 1973, Ser. No. 414,104
Claims priority, application Japan May 11, 1973
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

237,308
TRANSISTOR RADIO
Lee Yu-Cheung, Kowloon, Hong Kong, assignor to Sambarlon Electronic Company, Ltd., Kowloon, Hong Kong
Filed Apr. 2, 1974, Ser. No. 457,245
Claims priority, application Great Britain Oct. 9, 1973
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D56—4 B

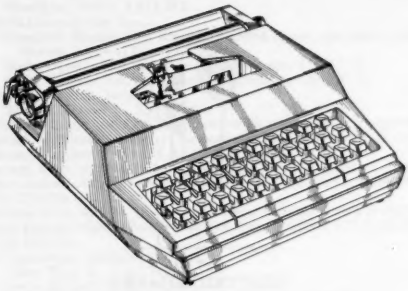
237,309
SLIDE PROJECTOR OR SIMILAR ARTICLE
Robert E. Bourke, Weston, Conn., assignor to GAF Corporation, New York, N.Y.
Filed Oct. 24, 1972, Ser. No. 299,867
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D61—1 J



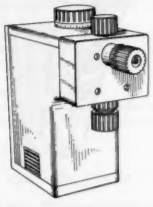
237,310
GAS MILEAGE CALCULATOR
Yehuda A. Konnan, North Palm Beach, Fla., assignor to Wykon Inc., Riviera Beach, Fla.
Filed July 18, 1973, Ser. No. 380,374
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D64—11 B



237,311
TYPEWRITER
Bill Gold, Great Neck, N.Y., and James Hedden, Lyndhurst, N.J., assignors to Louis Marx & Co., Inc., Stamford, Conn.
Filed Apr. 8, 1974, Ser. No. 459,255
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D64—11 A

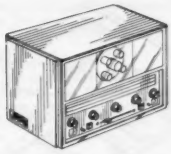


237,312
REGULATING PUMP
Didier Lombard, Pont-Saint-Pierre, Eure, France, assignor to Societe Dosapro Milton Roy
Filed Aug. 8, 1973, Ser. No. 386,506
Claims priority, application France Feb. 15, 1973
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D65—1 R

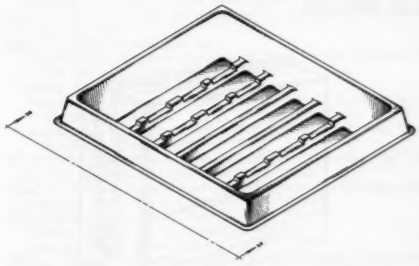


237,313
PHYSICAL THERAPY EXERCISER
Eugene L. Harris, 1203 N. Euclid, Anaheim, Calif. 92801
Filed July 26, 1973, Ser. No. 382,799
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D83—1 S

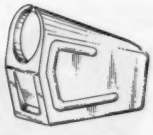
237,314
HEMO DIALYSIS MACHINE
C. Edwin Schmidt, 1672 Summerville, Tustin, Calif. 92680
Filed Oct. 3, 1973, Ser. No. 403,234
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 F



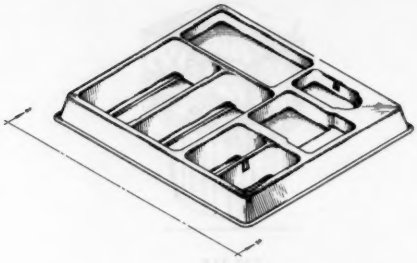
237,315
INCUBATOR TRAY
Edward Nowakowski, Chicago, and Harry James Pappas, Hinsdale, Ill., assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Mar. 4, 1974, Ser. No. 447,488
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 U



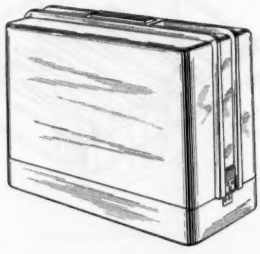
237,316
URINAL BOTTLE
Kenneth Wilson Mills, 11 Redcar Road, Smithills Dean, Bolton, Lancashire, England
Filed Oct. 17, 1973, Ser. No. 407,182
Claims priority, application Great Britain Aug. 8, 1973
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 U



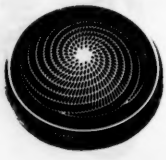
237,317
TEST KIT TRAY
Edward Nowakowski, Chicago, and Harry James Pappas, Hinsdale, Ill., assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Mar. 4, 1974, Ser. No. 447,487
Term of patent 14 years
Int. Cl. D24—*99*
U.S. Cl. D83—1 U



237,318
CARRYING CASE FOR A SEWING MACHINE
Marco Zanuso, Milan, Italy, and Richard Sapper, Stuttgart-Degerloch, Germany, assignors to Necchi, Societa per Azioni, Pavia, Italy
Filed Oct. 5, 1973, Ser. No. 403,851
Claims priority, application Italy Apr. 13, 1973
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



237,319
HEAD FOR ELECTRIC SHAVER
Satoshi Sakai, Hirakata-shi, Norio Shimizu, Neyagawa-shi, and Junji Nomura, Takatsuki-shi, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan
Filed May 21, 1973, Ser. No. 362,192
Claims priority, application Japan Nov. 27, 1972
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 B



237,320
DRY SHAVER OR SIMILAR ARTICLE
Maarten Willem van Lelyveld, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Aug. 27, 1973, Ser. No. 391,799
Claims priority, application Switzerland Mar. 1, 1973
Term of patent 14 years
Int. Cl. D95—*03*
U.S. Cl. D95—3 A

237,321
ELECTRIC SHAVER
Edward A. Irelan, Lombard, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Jan. 18, 1974, Ser. No. 434,721
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

237,322
ELECTRIC SHAVER
Hermann R. Schaefer, Bridgeport, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.
Filed Apr. 29, 1974, Ser. No. 464,792
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 A

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF OCTOBER, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. H. Robins Company, Incorporated: *See—*
Ward, John W.; and Lybrand, Robert A., 3,914,433.

A/S Akers Mek. Verksted: *See—*
Braekkan, Anton, 3,913,292.

Abbott Laboratories: *See—*
Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, 3,914,412.
Stein, Herman Hal; and Prasad, Raj Nandan, 3,914,414.
Stein, Herman Hal; and Prasad, Raj Nandan, 3,914,415.

Abex Corporation: *See—*
Sedlock, Daniel T., 3,913,716.

Ableitner, Erich; and Ott, Burkhard, to Daimler-Benz Aktiengesellschaft. Hydraulic valve-play compensating element for internal combustion engines. 3,913,538, Cl. 123-90.460.

Aboytes, Peter, to J. M. Huber Corporation. Bonding metals to elastomer systems utilizing nitrogenous treated furnace blacks. 3,914,148, Cl. 156-306.000.

Aboytes, Peter, to J. M. Huber Corporation. Bonding metals to elastomer systems utilizing halogen treated furnace blacks. 3,914,149, Cl. 156-306.000.

ACF Industries, Incorporated: *See—*
Carle, Ross G., 3,913,748.
Irwin, Richard C., 3,913,883.
Winkley, Jerry H., 3,913,539.

Ackerman, Carl F.: *See—*
Dyba, John J.; and Ackerman, Carl F., 3,914,532.

Ackerman, Leonard Stanley. Variable speed gearing. 3,913,410, Cl. 74-217.00C.

Acton, Daniel D.; and Koontz, Carl E., to Anchor Hocking Corporation. Closure cap with tamper indicator. 3,913,771, Cl. 215-256.000.

Adams, James S.; and Stevens, William M., to Hill-Rom Company, Inc. Electronic controls for a hospital bed. 3,913,153, Cl. 5-68.000.

Adams, Kenneth D.; Hauf, Robert C.; and Ostapczuk, Edward W., to Singer Company, The. Pattern selection system for sewing machines. 3,913,506, Cl. 112-121.130.

Adams, Roger Anthony: *See—*
Richards, Basil James; and Adams, Roger Anthony, 3,913,922.

Adams & Westlake Company, The: *See—*
Ehret, Yale W.; and Niessner, Adam, 3,913,265.

Addoms, John F.: *See—*
Kors, David L.; Lawver, Billy R.; and Addoms, John F., 3,914,347.
Kors, David L.; Addoms, John F.; and Lawver, Billy R., 3,914,348.

Addressograph-Multigraph Corporation: *See—*
Schulze, Erwin F. C., 3,913,905.

Aerojet-General Corporation: *See—*
Kors, David L.; Lawver, Billy R.; and Addoms, John F., 3,914,347.
Kors, David L.; Addoms, John F.; and Lawver, Billy R., 3,914,348.

AGA Aktiebolag: *See—*
Wiklund, Klas Rudolf, 3,914,052.

Agostinelli, Edward: *See—*
Osterholtz, Carl E.; Agostinelli, Edward; and Jagucki, Edward, 3,914,527.

Ahlstone, Arthur G., to Vetco Offshore Industries, Inc. Apparatus for setting and locking packing assemblies in subsurface wellheads. 3,913,670, Cl. 166-182.000.

Ahrns, Daniel C.: *See—*
Ernest, Robert P.; Ahrns, Daniel C.; Crowley, Thomas E.; and Ounsted, Edwin J., 3,913,198.
Ernest, Robert P.; and Ahrns, Daniel C., 3,913,706.

Aikawa, Hiroshi; and Ito, Naganori, to Nissan Motor Company Limited. Self-levelling vehicle suspension system. 3,913,938, Cl. 280-112.00A.

Air Preheater Company, Inc., The: *See—*
Dahar, Alex J., 3,913,501.

Air Products and Chemicals, Inc.: *See—*
Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,188.
Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,190.

Airko Manufacturing Company: *See—*
Porter, Donald C., 3,913,642.

Aisin Seiki Kabushiki Kaisha: *See—*
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,325.
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,418.

Ajinomoto Co., Inc.: *See—*
Yamagata, Mineo; Akamatsu, Akira; and Togo, Kazushi, 3,914,479.

Akamatsu, Akira: *See—*
Yamagata, Mineo; Akamatsu, Akira; and Togo, Kazushi, 3,914,479.

Akamatsu, Hiroshi: *See—*
Nishimura, Akira; Akamatsu, Hiroshi; Negoro, Sentaro; and Yoshida, Yasutoshi, 3,913,259.

Akao, Masatake; and Yamashita, Kazuo, to Matsushita Electric Industrial Company Limited. Method of making resin encapsulated electric coil. 3,914,467, Cl. 427-116.000.

Akazawa, Osamu: *See—*
Yamakami, Kiyoshi; Akazawa, Osamu; Shibata, Yoshiyuki; and Fujimoto, Nichio, 3,914,280.

Akino, Morio: *See—*
Hara, Satoshi; Akino, Morio; and Nakagawa, Keizo, 3,913,856.

Aktiebolaget Electrolux: *See—*
Lovgren, Kjell Ake Vilhelm, 3,913,168.
Nylen, Olle, 3,914,632.

Aktieselskabet Niro Atomizer: *See—*
Gronlund, Martin; and Gude, Klaus Erik, 3,913,237.

Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, to Takasago Perfumery Co., Ltd. Process for preparing 2-acetyl-5-methyl-4-hexenic acid esters. 3,914,289, Cl. 260-483.000.

Albright & Wilson Limited: *See—*
Hoye, Peter Albert Theodore; and Hargreaves, Roger Geoffrey, 3,914,431.
Williams, Thomas Alan, 3,914,382.

Alesi, John, Jr.: *See—*
Dean, Donald E.; and Alesi, John, Jr., 3,914,103.
Dean, Donald E.; and Alesi, John, Jr., 3,914,104.

Alexander, Chancey L. Combination hand and lift cart. 3,913,762, Cl. 214-506.000.

Alexandre, Pierre: *See—*
Morane, Bruno P.; and Alexandre, Pierre, 3,913,592.

Alfa-Laval AB: *See—*
Stenstrom, Lennart Arvid, 3,913,299.

Alfter, Franz-Werner: *See—*
Wienand, Michael; Jensen, Klaus; Primessing, Franz; and Alfter, Franz-Werner, 3,914,147.

Allen, Joseph Columbus; and Redford, David Arthur, to Texaco Inc.; and Texaco Exploration Canada. Method for establishing communication path in viscous petroleum-containing formations including tar sands for oil recovery operations. 3,913,672, Cl. 166-263.000.

Allen, Joseph Columbus: *See—*
Redford, David Arthur; and Allen, Joseph Columbus, 3,913,671.

Allen, Steve R. Attachable precision unit for seed planters. 3,913,798, Cl. 222-281.000.

Allied Chemical Corporation: *See—*
Cunningham, William J.; Sweeney, Richard F.; Yao, Charles C. Y.; and Anello, Louis G., 3,914,326.
Smith, Joseph A., 3,914,217.
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,861.
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,862.

Alling, Richard; and Hull, John R., to Torrington Company, The. Bearing offset lip cage. 3,913,994, Cl. 308-235.000.

Allington, William B., to Instrumentation Specialties Company. Electrophoresis method. 3,914,168, Cl. 204-180.00G.

Allis-Chalmers Corporation: *See—*
Carlson, Richard G., 3,913,680.
Larkin, Oscar L., 3,913,959.

Alliston, William H.; Johnson, Steven J.; and Mutafelija, Boris A., to Westinghouse Electric Corporation. Fluid distribution network and steam generators and method for nuclear power plant training simulator. 3,914,795, Cl. 444-1.000.

Allner, Olaf, to Loewe-Optal GmbH. Switching arrangement for picking up stored constant voltages. 3,914,700, Cl. 328-141.000.

Allum, Kenneth W.: *See—*
Purdom, Clyde H.; Allum, Kenneth W.; and Shackelford, Harold D., 3,913,731.

Altair, Hurletron: *See—*
Coberley, Daniel A.; and Resh, Mark, 3,914,582.

Altesleben, Jacques Joseph Antoine: *See—*
Maelstaf, Serge Marcel Yves; and Altesleben, Jacques Joseph Antoine, 3,914,724.

Alvarez, Robert J., to General Electric Company. Ice maker including improved rake assembly. 3,913,350, Cl. 62-353.000.

ALZA Corporation: *See—*
Shell, John W., 3,914,402.

Amano, Kenichi: *See—*
Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, 3,913,384.

Amax Inc.: *See—*
Clark, Franklin F.; and Rickard, Robert S., 3,914,375.
Koehler, Harold; Zundel, Weldon P.; and Rickard, Robert S., 3,914,374.

Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., to Owens-Illinois, Inc. Machine for producing a plastic-covered glass container. 3,914,152, Cl. 156-446.000.

Amchem Products, Inc.: *See—*
Hall, Wilbur S.; and Steinbrecher, Lester, 3,914,519.

Amend, Wilhelm; and Sotirovic, Toma, to Siemens Aktiengesellschaft. System for synchronizing a freely oscillating oscillator to a reference oscillation. 3,914,707, Cl. 331-4.000.

Amerace Corporation: *See—*
Fineran, Charles A.; and Silwones, Steven S., 3,914,178.
American Air Filter Company, Inc.: *See—*
Westlin, Karl L., 3,914,116.
American Building Components, Inc.: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; and Kushner, Benjamin, 3,913,816.
American Chain & Cable Company, Inc.: *See—*
Wentz, Edward A., 3,913,766.
American Cyanamid Company: *See—*
Cross, Barrington; and Grasso, Charles Paul, 3,914,285.
Fessler, Robert Glenn; and Tredinnick, Bruce Charles, 3,91-.,193.
Haacke, Gottfried C., 3,914,389.
Haeger, Bruce Edwin; and Nash, Robert Arnold, 3,914,419.
Marsico, Joseph William, Jr.; and Goldman, Leon, 3,914,264.
McGahren, William James, 3,914,317.
McGahren, William James; and Kunstmann, Martin Paul, 3,914,409.
Schoenholz, Daniel; Petersen, Arthur W.; and Hirschberger, Leonard, 3,914,197.
Sheehan, Desmond, 3,914,255.
Wilbur, Robert Daniel; and Pensack, Joseph Michael, 3,914,428.
American Home Products Corporation: *See—*
Kim, Dong H., 3,914,250.
American Optical Corporation: *See—*
Boughton, Olin W., 3,914,012.
Carpenter, George J., 3,913,568.
Richards, William D., 3,913,869.
Strack, Richard R.; and Smith, Merton L., 3,914,117.
American Telephone and Telegraph: *See—*
Schardt, Courtney Harold; and Schepis, Albert James, 3,914,561.
American Velcro, Inc.: *See—*
Ribich, William A.; and Russell, David B., 3,914,144.
AMP Incorporated: *See—*
Lockard, Joseph Larue, 3,914,570.
Zell, Dale Richard; and Martin, John Leroy, 3,914,531.
Anaconda Company, The: *See—*
Dyba, John J.; and Ackerman, Carl F., 3,914,532.
Anchor Hocking Corporation: *See—*
Acton, Daniel D.; and Koontz, Carl E., 3,913,771.
Ochs, Charles S., 3,913,772.
Oglesbee, Richard K., 3,913,778.
Anderson, Conroy D.; Carlson, David W.; Oleck, Stephen M.; and Stover, William A., to Mobil Oil Corporation. Catalyst reactor for oxidizing carbon monoxide and hydrocarbons in gaseous stream. 3,914,377, Cl. 423-213.700.
Anderson, David L., Jr. Fluid measuring circuit. 3,913,606, Cl. 137-205.000.
Anderson, Gordon C.: *See—*
Savageau, Richard J.; Clevenger, Earl C.; and Anderson, Gordon C., 3,913,190.
Anderson, Greenwood & Co.: *See—*
Greenwood, Marvin H.; and Powell, Walter W., 3,913,885.
Anderson, Robert C.: *See—*
Banker, John G.; and Anderson, Robert C., 3,913,657.
Anderson, Robert F., to Universal Oil Products Company. Alkylation reaction cooler. 3,914,110, Cl. 23-288.00E.
Anderson, Robert F., to Universal Oil Products Company. Alkylation reaction chamber. 3,914,111, Cl. 23-288.00E.
Anderson, Thomas Jon, to Du Pont de Nemours, E. I., and Company. Reduction of foaming in ammonia recovery system of a HCN manufacturing process. 3,914,386, Cl. 423-376.000.
Andersson, Ingmar; and Eriksson, Olle, to ASEA-ATOM. Core for nuclear reactors. 3,913,689, Cl. 176-87.000.
Andersson, Sven E., to Trelleborg Rubber Company, Inc. Wear resistant lining for grinding mills. 3,913,851, Cl. 241-300.000.
Andresen, Arne O., to Walker Forge, Inc. Ball and slide plate assembly for a mower sickle bar. 3,913,305, Cl. 56-303.000.
Andreux, Bernard, to Regie Nationale Des Usines Renault. Expansion tanks of cooling systems. 3,913,781, Cl. 220-203.000.
Andrews, Donald E., to Cambridge Wire Cloth Company. Belt aligner. 3,913,729, Cl. 198-202.000.
Andrews, William J. Method for fabricating Luneberg lens. 3,914,769, Cl. 343-911.00L.
Anello, Louis G.: *See—*
Cunningham, William J.; Sweeney, Richard F.; Yao, Charles C. Y.; and Anello, Louis G., 3,914,326.
ANF-Frangeco, S.A.: *See—*
Pelabon, Andre E., 3,913,495.
Anheuser-Busch, Incorporated: *See—*
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.
Aoki, Katashi, to Nissei Plastics Industrial Co., Ltd. Vent-type injection molding machine. 3,913,796, Cl. 222-238.000.
Aoki, Katashi. Apparatus for injection molding two-colored products. 3,914,081, Cl. 425-130.000.
Application Des'Gaz: *See—*
Remane, Roger, 3,913,609.
Apthorp, Carl R., III: *See—*
Faircloth, Paul G.; and Apthorp, Carl R., III, 3,913,758.
Arai, Toshimasa, to President of Nagoya Institute of Technology, Kokichi Sano. Rolling apparatus for manufacturing plastic gears. 3,914,083, Cl. 425-324.00R.
Aratani, Isamu: *See—*
Sawa, Hiroshi; Aratani, Isamu; and Narita, Koji, 3,914,482.
Arcara, Samuel A., to Leeds & Northrup Company. Temperature measurement with three-lead resistance thermometers by dual constant current method. 3,913,403, Cl. 73-362.0AR.
Archer, Bill; and Low, III: John Lewis, to Arlo, Inc. Twist lock joint for concrete filled, telescoping sections. 3,913,953, Cl. 285-290.000.
Arimino Chemical Co. Ltd.: *See—*
Sato, Nakaya, 3,913,593.
Arlo, Inc.: *See—*
Archer, Bill; and Low, III: John Lewis, 3,913,953.
Armor Elevator Company: *See—*
Maynard, John T., 3,914,674.
Armour and Company: *See—*
Smithers, James P., 3,913,434.
Svacik, Joseph T., 3,914,444.
Arnn, Edward T. Screw driver. 3,913,647, Cl. 145-50.00A.
Arnold, Alvin. Grain bin. 3,913,469, Cl. 98-55.000.
Arnold, Joyce P.: *See—*
Arnold, Kenneth E.; and Arnold, Joyce P., 3,913,243.
Arnold, Kenneth E.; and Arnold, Joyce P., to Lawrence Peska Associates, Inc., a part interest. Golf sandal. 3,913,243, Cl. 36-2.5AN.
Arrington, Earl J.; Deal, Jerry E.; and Hunsaker, Roger C., to Fort Worth Pressed Steel Corporation. Axial flow fan having fully streamlining flexible blades. 3,914,069, Cl. 416-132.000.
Arthur D. Little, Inc.: *See—*
Pars, Harry G.; Granchelli, Felix E.; and Razdan, Raj K., 3,914,237.
Arthur, Jett C., Jr.: *See—*
Portnoy, Norman A.; Reine, Alden H.; and Arthur, Jett C., Jr., 3,914,109.
Artos Engineering Company: *See—*
Blaha, Gerald E., 3,913,426.
Asahi Denka Kogyo Kabushiki Kaisha: *See—*
Terada, Kimio; Fujita, Satoshi; and Yoshida, Noritoki, 3,914,458.
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, to Kao Soap Co., Ltd. Preparation of solid polyamides useful as ink binders. 3,914,195, Cl. 260-18.00N.
Asal, Jerrold Ray: *See—*
Casey, Thomas Patrick; Asal, Jerrold Ray; and Olthoff, James Alan, 3,913,684.
ASEA-ATOM: *See—*
Andersson, Ingmar; and Eriksson, Olle, 3,913,689.
Askienazy, Alexandre; and Melki, Georges, to Compagnie Francaise de Produits Industriels. Bactericidal solutions containing iodine and a condensation product of propylene oxide and a trialkanalamine. 3,914,411, Cl. 424-150.000.
Assmus, Friedrich, to Gebruder Junghans GmbH. Hand mounting apparatus for a clock. 3,913,313, Cl. 58-138.000.
Astie, Gabriel S.: *See—*
Astie, Georges P.; Astie, Jean J.; and Astie, Gabriel S., 3,913,957.
Astie, Georges P.; Astie, Jean J.; and Astie, Gabriel S. Device for opening a window grille in case of fire. 3,913,957, Cl. 292-57.000.
Astie, Jean J.: *See—*
Astie, Georges P.; Astie, Jean J.; and Astie, Gabriel S., 3,913,957.
Atanasoff, Irving M.; Gosneil, Russell J.; and Smith, Jimmie L. Fluorescent tube digester. 3,913,849, Cl. 241-55.000.
Atlantic Richfield Company: *See—*
Rosenthal, Rudolph; and Bonetti, Giovanni A., 3,914,295.
Atwood, Elbridge L.: *See—*
Call, Donald H.; Atwood, Elbridge L.; Cary, Joseph A.; and Surette, James D., 3,914,173.
Auer, John H., Jr.; and Polsky, Lawrence M., to General Signal Corporation. Switching system with onboard and wayside switching. 3,913,491, Cl. 104-130.000.
August, Paul. Device for treatment of exhaust gases from an internal combustion engine. 3,913,323, Cl. 60-288.000.
Augustin, Eugene H.; Johnson, Roger E.; and Rakestraw, Thomas L., to Ford Motor Company. Vacuum glass stripping. 3,913,812, Cl. 225-2.000.
Aulner, Albert W.: *See—*
Aulner, Marvin J., Sr.; and Aulner, Albert W., 3,913,619.
Aulner, Marvin J., Sr.; and Aulner, Albert W. Hydraulic system air bleeder valve assembly with antivibration spring retainer. 3,913,619, Cl. 137-614.170.
Aumayer, Hansruedi: *See—*
McConnell, Lorne D.; and Aumayer, Hansruedi, 3,914,569.
Automatic Switch Company: *See—*
Rolfe, Alfred H., 3,913,884.
Avco Corporation: *See—*
Billing, Rudolph W.; and Castle, George K., 3,913,290.
Blake, Nathan L.; and Richards, Gerald F., 3,913,303.
Finelli, Thomas M.; Lenoe, Edward; and McAllister, Lawrence E., 3,914,395.
Roy, Paul A., 3,913,828.
Straniti, Salvatore, 3,914,070.
Avco Everett Research Laboratory, Inc.: *See—*
Friedman, Herbert W.; Caristi, Robert F.; and Morton, Richard G., 3,914,648.
Ayerst McKenna and Harrison Ltd.: *See—*
Bruderlein, Francois T.; and Humber, Leslie G., 3,914,305.
Ayres, David B. Sealing closure apparatus. 3,913,784, Cl. 220-348.000.
Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A.: *See—*
Gardini, Mario; and Tabaroni, Roberto, 3,913,203.
Azoulay, Claude. Fabric with discrete spaced projections of synthetic plastic material. 3,914,487, Cl. 428-93.000.

B. F. Goodrich Company, The: *See*—
Kroenke, William J., 3,914,201.

B & R Tool, Inc.: *See*—
Brase, George, 3,913,427.

Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, to Bell Telephone Laboratories, Incorporated. Near-infrared light emitting diodes and detectors employing $CdSnP_2$:InP heterodiodes. 3,913,212, Cl. 29-576.000.

Baker, Charles O. Aquatic exercising assembly. 3,913,907, Cl. 272-57.00R.

Baker, Charles T., to Vermont Marble Company. Method and apparatus for forming a receptacle closure. 3,913,372, Cl. 72-349.000.

Baker, John G., to PPG Industries, Inc. Tin-vanadium polyester accelerator system. 3,914,336, Cl. 260-863.000.

Baker Oil Tools, Inc.: *See*—
Barbee, John P., Jr.; and Richard, Charles A., 3,913,676.

Baker Perkins Inc.: *See*—
Scherping, Clarence K., 3,913,893.

Baker, Richard D. Guide device for power saw and the like. 3,913,440, Cl. 83-745.000.

Balassa, Leslie L. Process for facilitating wound healing with N-acetylated partially depolymerized chitin materials. 3,914,413, Cl. 424-180.000.

Baldwin, Arden E.; Carlson, Harold W.; and Miers, Bruce W., to Caterpillar Tractor Co. Track type tractors having resiliently mounted track roller assemblies. 3,913,987, Cl. 305-27.000.

Baldwin, Arlen R.; and Reinhardt, Thomas A., to United States of America, Energy Research & Development Administration. Thermal battery. 3,914,133, Cl. 136-83.00T.

Baldwin-Gegenheimer Corporation: *See*—
Brym, Stanley J., 3,913,797.
St. John, John G., 3,913,611.

Baldwin, John J.; and Novello, Frederick C., to Merck & Company, Inc. Tri-substituted imidazoles. 3,914,246, Cl. 260-309.000.

Ball, Eric, to Dunlop Limited. Flexible reinforcing structures. 3,913,624, Cl. 138-132.000.

Ball, Newton E., to Medical Instruments & Technology. Contraction monitor. 3,913,563, Cl. 128-2.00S.

Ballard, Denis George Harold: *See*—
Brown, Alistair Chalmers Ramsay; and Ballard, Denis George Harold, 3,914,513.

Ballard, Norman D.; and Zubeckis, John, to United Aircraft Corporation. Erosion prevention and fault detection for electrochemical machining apparatus. 3,914,170, Cl. 204-224.00M.

Ballin, Betty: *See*—
Ballin, Gene, 3,913,178.

Ballin, Gene, to Ballin, Betty; Cohen, Jean; and Schulman, Martin. Tie strip. 3,913,178, Cl. 24-16.000.

Ballonoff, Aaron, to Signetics Corporation; and Watkins-Johnson Company, part interest to each. Method for fabricating a precision aligned semiconductor array. 3,913,216, Cl. 29-580.000.

Balzers Patent und Beteiligungs AG: *See*—
Ritter, Elmar, 3,914,516.
Thelen, Alfred, 3,914,023.

Ban, Hitoshi: *See*—
Nagase, Hiroshi; and Ban, Hitoshi, 3,913,392.

Banker, John G.; and Anderson, Robert C., to United States of America, Energy Research and Development Administration. Method and apparatus for fabricating a composite structure consisting of a filamentary material in a metal matrix. 3,913,657, Cl. 164-62.000.

Banks, Ridgway M., to United States of America, Energy Research and Development Administration. Energy conversion system. 3,913,326, Cl. 60-527.000.

Bappert, Adolf: *See*—
Flesch, Friedrich; Bappert, Adolf; and Striegel nee Kloss, Marlen, 3,913,733.

Bar-on, Ari, to Xerox Corporation. Composite doctoring blade for a heated fuser roll utilized for fixing toner. 3,913,521, Cl. 118-60.000.

Barbee, John P., Jr.; and Richard, Charles A., to Baker Oil Tools, Inc. Method and apparatus for gravel packing. 3,913,676, Cl. 166-278.000.

Barber, Ernest C., to Texaco Inc. Oil recovery process which provides for the treatment of produced water before it is reinjected to drive oil toward the production wells. 3,913,673, Cl. 166-266.000.

Barber, Rodney Ian: *See*—
Elliott, John Scotchford; Jayne, Gerald John Joseph; and Barber, Rodney Ian, 3,914,241.

Bardone, Maria Rosa: *See*—
Pagani, Hermes; Coronelli, Carolina; Bardone, Maria Rosa; and Lancini, Giancarlo, 3,914,257.

Barefoot, Gerald A.; and Corsi, George L., to Federal-Mogul Corporation. Rotary shaft seal with expandable outer periphery. 3,913,924, Cl. 277-37.000.

Barie, Walter P., Jr.; and Franke, Norman W., to Gulf Research & Development Company. Polyepoxy resin-diaryl dianhydride laminating resins and laminates. 3,914,512, Cl. 428-413.000.

Barish, Benjamin J. Stylus actuated electrical device and electrical kit including same. 3,914,548, Cl. 178-18.000.

Barker, George E., to Monsanto Company. Layered rhodium and nickel catalyst for NO_2 reduction. 3,914,376, Cl. 423-213.500.

Barking Brassware Co. Limited: *See*—
King, Victor Howard George, 3,913,830.

Barmag Barmer Maschinenfabrik Aktiengesellschaft: *See*—
Lenk, Erich; Turk, Herbert; and Schiminski, Herbert, 3,913,852.

Barmby, David S.: *See*—
Kirsch, Francis William; Barmby, David S.; and Potts, John D., 3,914,383.

Barnes, Elwood Eugene; Emerson, Sidney Thomas; Rogers, Paul Clifton; and Simpson, Wilburn Dwain, to Periphonics Corporation. Memory having non-fixed relationships between addresses and storage locations. 3,914,747, Cl. 340-172.500.

Barpal, Isaac R., to Westinghouse Electric Corporation. Vehicle control system including residue breakdown voltage across the vehicle rails. 3,913,874, Cl. 246-182.00R.

Barraco, Anthony J.; and Wolfe, Martin E. Heater unit for cathode. 3,914,639, Cl. 313-271.000.

Barrett, Edward E.; and Pinczewski, Morris, to Swingline, Inc. Fastening element driving tool. 3,913,817, Cl. 227-126.000.

Barron, George E.; and Pavone, Harry, to Louis A. Grant, Inc. Ladle skimmer. 3,913,756, Cl. 214-32.000.

Barry, Vincent T., to Carrier Corporation. Motor compressor control. 3,913,342, Cl. 62-115.000.

Barth, Hans-Jorg: *See*—
von Jordan, Wenzel; Barth, Hans-Jorg; Koch, Hans; and Boning, Gunter, 3,914,387.

Bartolmei, Leroy A.: *See*—
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, 3,914,464.

Barton, James B.; and Cheek, Tom F., Jr., to Texas Instruments Incorporated. Isolation-element CCD serial-parallel-serial analog memory. 3,914,748, Cl. 340-173.00R.

Basch, E. Evert: *See*—
Finkel, Joel Roberts; Basch, E. Evert; and Bowerman, Edwin R., 3,914,596.

Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, to Ciba-Geigy Corporation. New anhydrofuranose derivatives and processes for their manufacture. 3,914,212, Cl. 260-209.00R.

Basf Aktiengesellschaft: *See*—
Jorek, Helmut; Fikentscher, Rolf; Kurze, Joachim; and Helfert, Herbert, 3,914,496.
Naarmann, Herbert; and Pohlemann, Heinz, 3,914,329.

Basu, Samir K.; and Masham, Roger D., to Xerox Corporation. Optical scanning system. 3,914,049, Cl. 355-68.000.

Bata Shoe Company, Inc.: *See*—
Hujik, Ladislav, 3,914,086.

Batcher, Kenneth Ray, to Westvaco Corporation. Papermaking machine headbox slice opening adjusting screws. 3,914,156, Cl. 162-347.000.

Bates, Gregory John, to Dunlop Limited. Vehicle suspensions. 3,913,940, Cl. 280-124.00R.

Bates Printing Specialties, Inc.: *See*—
Stipek, Charles J., Jr., 3,914,483.

Battelle Memorial Institute: *See*—
Meylan, Jean-Luc Ch.; Frost, William H.; and Meier, John G., 3,913,667.

Bauer, Adolf; Weber, Karl-Heinz; Danneberg, Peter; and Kuhn, Franz-Josef, to Boehringer Ingelheim GmbH. 1-Phenyl-3H-1,4-benzodiazepine-2,5-(1H,4H)-diones. 3,914,216, Cl. 260-239.30D.

Baumer, Michael; and Baumgartner, Ludwig, to Friedrich Deckel Aktiengesellschaft. Device for clamping a thin-walled tool spindle sleeve. 3,913,192, Cl. 29-1.00A.

Baumgarten, Carl B., to Gomco Surgical Manufacturing Corporation. Hemostat. 3,913,586, Cl. 128-325.000.

Baumgartner, Ludwig: *See*—
Baumer, Michael; and Baumgartner, Ludwig, 3,913,192.

Bayer Aktiengesellschaft: *See*—
Boshagen, Horst; Geiger, Walter; and Medenwald, Hans, 3,914,242.
Ersfeld, Heinrich; Schulte, Klaus; and Boden, Heinrich, 3,913,892.
Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst; and Scheinpflug, Hans, 3,914,427.
Lorenz, Walter; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,914,243.
Rudolph, Hans; Heine, Hans-Georg; Fuhr, Karl; and Schnell, Hermann, 3,914,166.
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; by Ruter, Elisabeth, heiress; and by Ruter, Edla, heiress, to Gebr. Giulini GmbH. Plaster casts. 3,913,571, Cl. 128-91.000.

Bayer, Oldrich; Snasel, Josef; and Premyslovsky, Jiri, to SVIT, narodni podnik. Apparatus for manufacturing boxes. 3,913,466, Cl. 93-51.0HW.

Bayliss, Peter. Heat resistant wall construction. 3,913,666, Cl. 165-106.000.

BBC Brown, Boveri & Company, Limited: *See*—
Marek, Alois, 3,914,780.
Mottier, Francois M.; and Dandliker, Rene, 3,914,056.

Bear Manufacturing Corporation: *See*—
Butler, Louis L., 3,913,236.

Beatty, Theodore R.; and Vourlis, Harry, to Union Carbide Corporation. Heat-treated, corona-treated polymer bodies and a process for producing them. 3,914,521, Cl. 428-461.000.

Beaver, William D. Method of making piezoelectric devices. 3,913,195, Cl. 29-25.350.

Beazley, Phillip M., to Marathon Oil Company. Elemental sulfur produced by wet oxidation of hydrogen sulfide. 3,914,399, Cl. 423-573.000.

Becker, Klaus; and Sprung, Hartwig, to DEMAG Aktiengesellschaft. Rail structure. 3,913,712, Cl. 191-32.000.

Becker, Reinhard, to Karl Becker KG. Apparatus for planting individual seeds in predetermined locations. 3,913,503, Cl. 111-77.000.

Becker, Reinhard F.: *See*—
Blount, Floyd E.; Becker, Reinhard F.; Lechler, Siegfried; and Ockelmann, Helmut, 3,913,678.

Beckerman, Martin; Murphy, John A.; Orlandi, John V.; and Smith, George W., to International Business Machines Corporation. Method of making tubeless gas panel. 3,914,000, Cl. 316-20.000.

Bedard, Ronald L.; Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., to Raychem Corporation. Method of forming self-limiting conductive extrudates. 3,914,363, Cl. 264-105.000.

Bedell, Stanley F.; and Taylor, Lloyd D., to Polaroid Corporation. K-sheet type polarizers prepared from polyvinyl alcohol graft copolymers. 3,914,017, Cl. 350-154.000.

Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, to Montecatini Edison S.p.A.; and New Jersey Zinc Company, The. Method for obtaining titanium dioxide having a controlled particle size. 3,914,396, Cl. 423-613.000.

Bedzyk, Victor Lee: *See*—
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.

Beecroft, Harold James, to Control Data Corporation. Flexible pad load coupling. 3,914,792, Cl. 360-103.000.

Begland, Robert Walter, to Du Pont de Nemours, E. I., and Company. Preparation of disperse bisanil dyes derived from diaminomaleonitrile. 3,914,276, Cl. 260-465.00E.

Begland, Robert Walter, to Du Pont de Nemours, E. I., and Company. Aminomethyleneaminomaleonitriles. 3,914,279, Cl. 260-465.50R.

Behnk, Donald J., to Hoffman, William; and Goldberg, Morris. Glass cleaning device. 3,913,165, Cl. 15-244.00R.

Behrenz, Wolfgang: *See*—
Lorenz, Walter; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,914,243.

Belknap, Donald J. Incandescent lamps having preformed filament units. 3,914,640, Cl. 313-315.000.

Bell & Howell Company: *See*—
Thomsen, Jack W., 3,913,867.
Weber, Paul Egon, 3,913,872.

Bell, Malcolm Charles Evert: *See*—
O'Neill, Charles Edward; Sridhar, Ramamritham; and Bell, Malcolm Charles Evert, 3,914,124.

Bell Telephone Laboratories: *See*—
Ohm, Edward Allen, 3,914,764.

Bell Telephone Laboratories, Incorporated: *See*—
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, 3,913,212.
Bonser, Richard Harlan; and Willett, Robert Joseph, 3,914,741.
Dyment, John Cameron; and Schwartz, Bertram, 3,914,465.
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, 3,914,743.
Ingle, James Flagg, 3,914,758.
Ketchow, Doris Rahb, 3,914,785.
Knollman, Dieter John Henry, 3,914,559.
Logan, Benjamin Franklin, Jr., 3,914,591.
Meadors, Howard Clarence, Jr., 3,914,691.
Ohm, Edward Allen, 3,914,768.
O'Neill, John Francis, 3,914,557.
Peterson, William Anders, 3,914,626.
Rosenberg, Robert L.; and Schmidt, Ronald Vernon, 3,914,717.
Schardt, Courtney Harold; and Schepis, Albert James, 3,914,561.
Seidel, Harold, 3,914,554.

Bellamy, Winthrop D., to General Electric Company. Osmotic pressure control to improve thermophilic microorganism growth. 3,914,437, Cl. 426-53.000.

Belue, James C.; and Jones, Weston C., to Owens-Corning Fiberglas Corporation. Method of coating and drying strands. 3,914,477, Cl. 427-378.000.

Bendayan, Jacques, to Les Cables de Lyon. Electric telecommunication cable having an axial carrier core. 3,914,533, Cl. 174-126.0CP.

Bendix Corporation, The: *See*—
Hart, John E.; Penn, William H., Jr.; and Tuss, John J., 3,913,412.
Hooton, Norris A.; and Jannasch, Norman E., 3,914,508.
Jackson, Harold W., 3,914,624.
Stauffer, Reuben Laverne, 3,914,703.

Benedetto, Bruno: *See*—
Maquignaz, Mario; Benedetto, Bruno; and Lingeri, Antonio, 3,913,476.

Benerito, Ruth R.: *See*—
Berni, Ralph J.; Benerito, Ruth R.; and Pilkington, Mary W., 3,914,108.

Benford, Arthur E., to Whirlpool Corporation. Refrigeration apparatus enclosure structure. 3,913,996, Cl. 312-214.000.

Benker, Frederick H., Jr., to Texas Instruments Incorporated. Self lubricating tool. 3,913,375, Cl. 72-463.000.

Bennett, Frank P.; and Hall, Walter J., to GAF Corporation. Slide changing mechanism. 3,914,039, Cl. 353-114.000.

Bennett, Willard H., to United States of America, Air Force. Method and apparatus for focusing an electron beam. 3,914,637, Cl. 313-230.000.

Benton, Richard E., to General Tire & Rubber Company, The. Sponge rubber rug underlay having improved heat age resistance. 3,914,186, Cl. 260-2.5HB.

Benton, Samuel T.; and Masters, David R., to United States of America, Energy Research & Development Administration. Method for preparing boron-carbide articles. 3,914,371, Cl. 264-332.000.

Benzing, James A., to Champion International Corporation. Roll forming carton lidding machine. 3,913,300, Cl. 53-287.000.

Berg, Allen Clark; Fargensi, Rudolph; and Lipani, Anthony Frank, to Xerox Corporation. Electrostatographic developer mixtures comprising ferrite carrier beads. 3,914,181, Cl. 252-62.100.

Berg, Joseph E.; and Brown, Randolph E., Jr., to Precision Thin Film Corporation. High vacuum deposition apparatus. 3,913,520, Cl. 118-7.000.

Berglund, Carl Neil: *See*—
Coderre, William Michael; Berglund, Carl Neil; and Tillman, Philip Robert, 3,914,642.

Bergwerksverband GmbH: *See*—
Juntgen, Harald; Knoblauch, Karl; Gappa, Gunther; and Schwarte, Jurgen, 3,913,253.

Berliner, Mayer; and Stewart, James G., to Sherwood Medical Industries Inc. Conductive tubing and method of making same. 3,914,002, Cl. 339-16.00R.

Bernard, Russell J., to Spectrol Electronics Corporation. Method of manufacturing a trimmer potentiometer. 3,913,222, Cl. 29-621.000.

Berner, Klaus; Kugler, Jorg; and Grote, Hans-Gunther, to Stahlwerke Peine-Salzgitter Aktiengesellschaft. Apparatus for ultrasonic testing of metallic sheets or the like. 3,913,388, Cl. 73-67.80S.

Bernholz, William F.: *See*—
Nahta, Roop; Bernholz, William F.; Redston, John Percy; and Warman, Murray, 3,914,177.

Berni, Ralph J.; Benerito, Ruth R.; and Pilkington, Mary W., to United States of America, Agriculture. Process for increasing receptivity to fluorescent whitening agents in resin-treated cellulosic textiles. 3,914,108, Cl. 8-185.000.

Bernstein, Jack; and Sowinski, Francis Alexander, to E. R. Squibb & Sons, Inc. 3,5-Disubstituted-2,4,6-triiodobenzoic acids. 3,914,294, Cl. 260-519.000.

Berry, Robert L., to Hughes Aircraft Company. Reduction in cooldown time for cryogenic refrigerator. 3,913,339, Cl. 62-6.000.

Bevan, Christopher Graham, to C. G. Bevan Associates Limited. Building or constructional material. 3,914,359, Cl. 264-45.300.

Bevins, Marvin W., to M. W. Bevins Co., Inc. Continuity testing device for a high voltage measurement device. 3,914,687, Cl. 324-51.000.

Bhusri, Gurcharan Singh: *See*—
Hirschhorn, Ralph Isaac; and Bhusri, Gurcharan Singh, 3,914,656.

Bianchini, Gianni, to Societa Italiana Elettronica S.p.A. Fail-safe apparatus for checking the presence of flame in a burner. 3,914,662, Cl. 317-124.000.

Big Drum, Inc.: *See*—
Wise, Robert T.; and Sutton, David M., 3,913,801.

Bigbie, Claude R., to United States of America, Army. IR-detector gain control with ambient temperature compensating means. 3,914,610, Cl. 250-338.000.

Bigelow, Arthur G.; Bigelow, Wilbur W.; and Stone, Gale E., to Checkpoint Systems, Inc. Apparatus for and method of auditing business records. 3,914,578, Cl. 235-61.70R.

Bigelow, Wilbur W.: *See*—
Bigelow, Arthur G.; Bigelow, Wilbur W.; and Stone, Gale E., 3,914,578.

Bille, Heinz. Apparatus for pumping liquid concrete. 3,914,074, Cl. 417-516.000.

Billet, Lucien; and Jouffret, Michel, to Rhone-Poulenc Industries. Process for splitting cycloaliphatic hydroperoxides. 3,914,291, Cl. 260-487.000.

Billing, Rudolph W.; and Castle, George K., to Avco Corporation. Fire insulation edge reinforcements for structural members. 3,913,290, Cl. 52-347.000.

Billings, William W.; and Tipton, Lynn L., to Westinghouse Electric Corporation. Zero crossover circuit. 3,914,625, Cl. 307-235.00R.

Bilted Industries Ltd.: *See*—
Ewanika, Theodore; and Walker, William, 3,913,557.

Bisberg, Aaron M. Folder for overhead projector and easel use. 3,913,740, Cl. 206-472.000.

Bischoff, Robert F., Jr. Grille or divider for a window sash. 3,913,293, Cl. 52-456.000.

Bissell, James D. Electronic game or manual dexterity testing device. 3,913,909, Cl. 273-1.00E.

Black and Decker Manufacturing Company, The: *See*—
Speer, Howard David; and Gerke, Burton Elwood, Jr., 3,913,437.

Blaha, Gerald E., to Artos Engineering Company. Insulated wire cutting and stripping mechanism having double knock-out means for waste material. 3,913,426, Cl. 81-9.510.

Blainie, Jean Marie Michel Paul: *See*—
Guichard, Jean-Claude; Gaillard, Anne; and Blainie, Jean Marie Michel Paul, 3,913,631.

Blake, Nathan L.; and Richards, Gerald F., to Avco Corporation. Feed roll construction for forage harvester. 3,913,303, Cl. 56-14.100.

Blake, Robert Joseph, to Stauffer Chemical Company. Catalyst regeneration. 3,914,328, Cl. 260-659.00A.

Blaw-Knox Foundry & Mill Machinery, Inc.: *See*—
Eibe, Werner W., 3,913,368.

Blazer, Sidney J.; and Jacobs, Mark C. Can closure device. 3,913,779, Cl. 220-243.000.

Bletry, Pierre C.; and David, Bernard E., to Pierre Mariotte S.A. Method of gilding sheets, notably for making stamps. 3,914,474, Cl. 427-272.000.

Blitz, Hans-Dieter: *See—*
Krieg, Manfred; Suetterlin, Norbert; and Blitz, Hans-Dieter, 3,914,338.

Bloch, Herman S., to Universal Oil Products Company. Biodegradable sulfate detergents. 3,914,271, Cl. 260-458.000.

Block Drug Company, Inc.: *See—*
Singer, Arnold J., 3,913,842.

Blount, Floyd E.; Becker, Reinhard F.; Lechler, Siegfried; and Ockelmann, Helmut, to Mobil Oil Corporation. Method and composition for treating a well to prevent the formation of sulfur and scale depositions. 3,913,678, Cl. 166-310.000.

Blow, James H., Jr. Supplemental pedalling mechanism for bicycles. 3,913,944, Cl. 280-231.000.

Blu, Gilbert: *See—*
Lazarre, Flavien; Blu, Gilbert; and Rozand, Jacques, 3,913,560.

Blum Gesellschaft m.b.H.: *See—*
Rock, Erich; and Mages, Bernhard, 3,913,173.

Board of Regents of the University of Nebraska, The: *See—*
Mebus, Charles A., 3,914,408.

Boccalari, Mario: *See—*
Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., 3,913,208.

Bode, Wolfgang W.; and Fein, Michael E., to Owens-Illinois, Inc. Gaseous discharge display/memory device with improved memory margin. 3,914,635, Cl. 313-226.000.

Boden, Heinrich: *See—*
Ersfeld, Heinrich; Schulte, Klaus; and Boden, Heinrich, 3,913,892.

Boehringer Ingelheim GmbH: *See—*
Bauer, Adolf; Weber, Karl-Heinz; Danneberg, Peter; and Kuhn, Franz-Josef, 3,914,216.
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, 3,914,432.

Boehringer Mannheim GmbH: *See—*
Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, 3,914,219.

Boeing Company, The: *See—*
Franklin, James L.; and Pogson, John T., 3,913,665.
Maroshick, Max, 3,913,497.

Boettcher, Stephen A., to Speedfam Corporation. Apparatus for machining work pieces. 3,913,271, Cl. 51-5.00R.

Bogle, Hugh A.: *See—*
Nugent, William A.; Williams, William Lloyd; and Bogle, Hugh A., 3,913,889.

Bohnert, Thomas J.: *See—*
Dunbar, Joseph E.; and Bohnert, Thomas J., 3,914,316.

Bohni, Erika, to Hoffman-La Roche Inc. Non-cariogenic foods and delicacies containing xylitol as a sugar substitute. 3,914,434, Cl. 424-343.000.

Bolger, John G. Supplying power to vehicles. 3,914,562, Cl. 191-10.000.

Bolick, R. Glenn, to United States of America, Navy. Stable gyro reference for projectiles. 3,913,870, Cl. 244-3.200.

Boller, Thomas E.; and Guerra, Salvatore, to Ford Motor Company. Glass cutting fluid. 3,914,180, Cl. 252-58.000.

Bollinger, John J.: *See—*
Watson, George A.; and Bollinger, John J., 3,914,580.

Boltz, Charles D., Jr., to RCA Corporation. Timing signals for velocity error correction. 3,914,542, Cl. 178-6.60A.

Bond, William C., Jr.: *See—*
Johansson, Anders H.; and Bond, William C., Jr., 3,914,478.

Bone, Clive, to Post Office, The. Electrical connector. 3,914,004, Cl. 339-97.00R.

Bonetti, Giovanni A.: *See—*
Rosenthal, Rudolph; and Bonetti, Giovanni A., 3,914,295.

Boning, Gunter: *See—*
von Jordan, Wenzel; Barth, Hans-Jorg; Koch, Hans; and Boning, Gunter, 3,914,387.

Bonser, Richard Harlan; and Willett, Robert Joseph, to Bell Telephone Laboratories, Incorporated. Fault detection arrangement for digital transmission system. 3,914,741, Cl. 340-146.10C.

Booth, David W.: *See—*
Jones, Marvin L.; and Booth, David W., 3,914,139.

Borello, Domenic. Technique for the continuous production of an expanded metal strip. 3,913,193, Cl. 29-6.200.

Borg-Warner Corporation: *See—*
Gyory, Emeric J., 3,913,925.

Borgford, Skapti Josef. Shear form structures. 3,914,486, Cl. 428-73.000.

Boron, Joseph J., to Rossborough Manufacturing Co. Sampling device. 3,913,404, Cl. 73-425.40R.

Boscacci, William L.: *See—*
Lucasey, Joseph A.; and Boscacci, William L., 3,913,880.

Bosch, Paul, to Robert Bosch GmbH. Slide block control means for radial piston machines. 3,913,456, Cl. 91-497.000.

Bose, Amar G., to Bose Corporation. Electrical audio signal processing. 3,914,549, Cl. 179-1.00G.

Bose Corporation: *See—*
Bose, Amar G., 3,914,549.

Boser, Ronald J., to Special Sewing Systems, Inc. Two-needle pneumatic disengaging mechanism. 3,913,508, Cl. 112-221.000.

Boshagen, Horst; Geiger, Walter; and Medenwald, Hans, to Bayer Aktiengesellschaft. 3-Imino-1,2-benzisothiazolines. 3,914,242, Cl. 260-304.000.

Bostroem, Theodore. Process of hot dip metallizing of metallic articles. 3,914,481, Cl. 427-406.000.

Botula, Bernard C.: *See—*
Gruodis, Romualdas K.; Botula, Bernard C.; and Milan-Kamski, Wojslaw J., 3,913,730.

Boughton, Olin W., to American Optical Corporation. Binocular body for microscope permitting variation of interpupilary distance without compensating lenses. 3,914,012, Cl. 350-75.000.

Bourassa, Aline M. Mask for bingo card. 3,913,921, Cl. 273-135.00B.

Bourgoin, Rene Leon Clement: *See—*
Proner, Raymond Louis; and Bourgoin, Rene Leon Clement, 3,913,761.

Boutacoff, Theodore A., to Envex Corporation. Modular building unit. 3,913,286, Cl. 52-648.000.

Bowdle, Raymond Ralph; and Laybourn, Robert Junior, to International Business Machines Corporation. Drum printer. 3,913,722, Cl. 197-54.000.

Bowe, James M.: *See—*
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,753.
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,754.

Bowen, Kenneth L. Cycle seat. 3,913,974, Cl. 297-195.000.

Bowerman, Edwin R.: *See—*
Finkel, Joel Roberts; Basch, E. Evert; and Bowerman, Edwin R., 3,914,596.

Bowers, William S., to United States of America, Agriculture. Certain epoxy compounds for insect control. 3,914,429, Cl. 424-278.000.

Bowes, Emerson: *See—*
Lucki, Stanley J.; Chen, Nai Yuen; and Bowes, Emerson, 3,914,331.

BP Chemicals International Limited: *See—*
Gasson, Edward James; Marrian, Stanley Frederic; and Krosnar, Thomas Charles, 3,914,278.

Braband, Edward C., to Xerox Corporation. Collating apparatus. 3,913,467, Cl. 93-93.0DP.

Bradford, John O.: *See—*
Fackler, Kenneth C.; and Bradford, John O., 3,913,242.

Braekkan, Anton, to A/S Akers Mek. Verksted. Self-sustaining wall and ceiling panel forming a hollow body and filled with a fireproof material. 3,913,292, Cl. 52-406.000.

Brandsma, Mark, to Varios-Fabrieken B.V. Vee-welding. 3,913,821, Cl. 228-216.000.

Brase, George, to B & R Tool, Inc. Tool for removing broken threaded fasteners. 3,913,427, Cl. 81-53.200.

Bratten, Winfred A. Rotary engine. 3,913,534, Cl. 123-8.490.

Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., to Victor Comptometer Corporation. Air gun with removable projectile holding means. 3,913,553, Cl. 124-15.000.

Braun, Alfons, to Maschinenfabrik Braun KG. Debarking machine. 3,913,644, Cl. 144-208.00E.

Brawley, Thomas Scott. Lapping, pressure grinding and flash roll apparatus and method. 3,913,275, Cl. 51-59.00R.

Break, Douglas G. Supplemental bending attachment for portable sheet material bending brake. 3,913,370, Cl. 72-322.000.

Brennan, Francis P. Packing brace for a washing machine. 3,913,736, Cl. 206-320.000.

Brennan, John J.; Novak, Richard C.; and De Crescente, Michael A., to United Aircraft Corporation. Tungsten wire reinforced silicon nitride articles and method for making the same. 3,914,500, Cl. 428-295.000.

Breuer, Hermann: *See—*
Treuner, Uwe D.; and Breuer, Hermann, 3,914,221.

Brewer, Gilbert G. Wheel assembly. 3,913,982, Cl. 301-45.000.

Brichima S.p.A.: *See—*
Maggioni, Paolo, 3,914,323.
Maggioni, Paolo, 3,914,324.

Bridgestone Tire Co., Ltd.: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Briggs, Kenneth H. Portable door lock. 3,913,962, Cl. 292-292.000.

Brill, Frank D.; and Weimer, Ralph E., to Restaurant Technology, Inc. Double service beverage tower. 3,913,792, Cl. 222-144.500.

Brinton, Rodric E., to Nicholson, G. W., a part interest. Flush valve assembly. 3,913,149, Cl. 4-67.00A.

Bristol-Myers Company: *See—*
Godfrey, John Carl, 3,914,410.

British Leyland UK Limited: *See—*
Johnson, Frederick Stanley; and Longstaff, Kenneth, 3,914,665.

British Oxygen Company Limited, The: *See—*
Tantam, Donald Harry, 3,913,776.

British Petroleum Company Limited, The: *See—*
Byford, Derek Clark; and Mundye, Anthony Arnold John, 3,914,179.
Desty, Denis Henry; and Lunn, Howard Cervase, 3,914,089.

British Secretary of State for Trade and Industry: *See—*
Elliot, George, 3,913,396.

British Titan Limited: *See—*
Hornby, Michael Robert; and Tunstall, David Frank, 3,914,604.

Broad, Michael Charles, to Microcomb Structures Limited. Fabricated cellular body and method for assembling said body. 3,913,210, Cl. 29-455.000.

Brocchi, Mario, to F. Lli Sandretto S.a.s. Device for adjusting the opening travel of the movable plate of a moulding machine for plastic materials. 3,914,087, Cl. 425-451.900.

Brodsky, Larry: *See*—
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; and Kushner, Benjamin, 3,913,816.

Broekstra, Bert; and Wilwerding, Dennis J., to Honeywell Inc. Light sensor for use with electronic flash units. 3,914,647, Cl. 315-241.00P.

Broido, Jacques Jean Georges Gaston. Grinding or polishing devices. 3,913,279, Cl. 51-209.000.

Brokke, Mervin E., to Stauffer Chemical Company. Certain trifluorobutenyl compounds and their utility as nematocides. 3,914,251, Cl. 260-326.0N5.

Brooke, Peter Howard; Dickinson, Ian James; Kavanagh, David Cecil; and Smith, Colin, to Pilkington Brothers Limited. Annealing of patterned glass. 3,914,118, Cl. 65-95.000.

Brooks, Robert A., to Continental Oil Company. Well logging apparatus including a releasable extendible spring member having a wellbore wall engaging contact. 3,914,686, Cl. 324-10.000.

Brooks, Roger Dean, to Deere & Company. Test fixture for determining static and dynamic loading on clutch plates. 3,913,395, Cl. 73-118.000.

Bross, William T., to Sybron Corporation. Control circuit for electrosurgical units. 3,913,583, Cl. 128-303.140.

Brown, Alistair Chalmers Ramsay; and Ballard, Denis George Harold, to Imperial Chemical Industries Limited. Substrates coated with fire resistant compositions. 3,914,513, Cl. 428-425.000.

Brown, Billy E.: *See*—
Moore, Francis C.; Perkinson, Leon R.; and Brown, Billy E., 3,913,562.

Brown, Gaylord William. Apparatus for folding container rims. 3,914,102, Cl. 425-392.000.

Brown, Henry S.: *See*—
Drinkard, William F., Jr.; and Brown, Henry S., 3,914,163.

Brown, James L., to Honeywell Information Systems Inc. Shifting apparatus. 3,914,744, Cl. 340-172.500.

Brown, Jasper H.; Cooper, John A.; and Morgan, Albert W., to Monsanto Company. Flame retarded carpet underlay. 3,914,503, Cl. 428-313.000.

Brown, Melanethon S., deceased; and by Kohn, Gustave K., administrater, to Chevron Research Company. Dithio-substituted carbamates. 3,914,259, Cl. 260-346.20R.

Brown, Randolph E., Jr.: *See*—
Berg, Joseph E.; and Brown, Randolph E., Jr., 3,913,520.

Brown, Samuel L.: *See*—
Travor, Bruce W.; Brown, Samuel L.; and Wenocur, Brian D., 3,913,489.

Browning Arms Company: *See*—
Browning, Val A., 3,913,251.

Browning-Ferris Industries, Inc.: *See*—
Red, Richard W., Jr., 3,913,806.

Browning, Val A., to Browning Arms Company. Self-retaining magazine plug. 3,913,251, Cl. 42-49.00A.

Brownlee, Milton A.; and Lanham, Robert L., to International Paper Company. Leak proof bottom for a paperboard container. 3,913,825, Cl. 229-38.000.

Brownlee, Milton A.; and Tomlin, Thomas A., to International Paper Company. Leak proof bottom for a paperboard container. 3,913,826, Cl. 229-38.000.

Bruckmann, Erich Karl Ludwig. Stanchion base. 3,913,875, Cl. 248-43.000.

Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., to United States Postal Service; and Liberity Carton Service. Shipping container for mail cartons. 3,913,827, Cl. 229-38.000.

Bruderlein, Francois T.; and Humber, Leslie G., to Ayerst McKenna and Harrison Ltd. N-[(10,11-dihydro-5H-dibenzo[a,d]cycloheptene-5-yl)methyl]amides. 3,914,305, Cl. 260-562.00B.

Brulfert, Andre; and Hoss, Andre Gabriel. Sliding partition rotary engine with rectilinear seals. 3,914,075, Cl. 418-11.000.

Brumleve, Thomas D.; Hicks, Mearle G.; and Jones, Milton O., to United States of America, Energy Research and Development Administration. System for remote control of underground device. 3,914,732, Cl. 340-15.000.

Brumlik, George C. Multi-element gripping device. 3,913,183, Cl. 24-204.000.

Brummit, Lonnie B. Naval warfare board game apparatus. 3,913,920, Cl. 273-134.0GM.

Brun, Andre; Jaffe, Albert; and de Panafieu, Philippe, to Subsea Equipment Associates Ltd. Method of installation and control of underwater equipment. 3,913,669, Cl. 166-.600.

Brunie, Jean Claude; Costantini, Michel; Crenne, Noel; and Jouffret, Michel, to Rhone-Poulenc, S.A. Process for preparing acyloxyalkanals from cycloalkyl hydroperoxide and formic acid. 3,914,292, Cl. 260-488.00F.

Brunson, Alton. Off-set nut runner with open-end access and socket-like drive capability. 3,913,428, Cl. 81-57.430.

Brunswick Corporation: *See*—
Forsgren, Lyle M., 3,913,694.

Brym, Stanley J., to Baldwin-Gegenheimer Corporation. Fluid dispensing system. 3,913,797, Cl. 222-253.000.

Bucalo, Louis, to Shods Incorporated. Horseshoe capable of adapting to hoof growth and impact. 3,913,679, Cl. 168-8.000.

Buchel, Karl Heinz: *See*—
Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst; and Scheinpflug, Hans, 3,914,427.

Buck, Erville C., to FMC Corporation. Strapping machine with short feed lockout. 3,913,472, Cl. 100-4.000.

Buck K.G., Firma: *See*—
Schiessl, Alois; and Huber, Paul, 3,913,482.

Buehler, Ernest: *See*—
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, 3,913,212.

Bull, Michael J.: *See*—
Searle, Robert J. G.; Woodall, Roger E.; and Bull, Michael J., 3,914,274.

Bunker Ramo Corporation: *See*—
Hovey, Ralph James, 3,914,520.

Burdick, Neal M. Indicator apparatus for developing output indications indicative of input signals. 3,914,701, Cl. 328-151.000.

Burg, Stanley P.; and Hentschel, William J., to Grumman Allied Industries Inc. Low pressure storage of metabolically active material with open cycle refrigeration. 3,913,661, Cl. 165-3.000.

Burgdorf, Jochen; Klose, Karl-Heinz; and Storzel, Karl, to ITT Industries, Inc. Spot-type disc brake. 3,913,709, Cl. 188-73.400.

Burgin, Kermit H. Grain drying storage bin. 3,913,239, Cl. 34-102.000.

Burkardt, Lohr A.: *See*—
Morley, Carl H.; and Burkardt, Lohr A., 3,914,053.

Burmah Oil Trading Limited: *See*—
Ker, Robert Alan Cameron; and Harrington, Colin John, 3,914,182.

Burnham, William W. Tape recorder alignment apparatus. 3,914,793, Cl. 360-134.000.

Burroughs Corporation: *See*—
Kupsky, George A., 3,914,643.

Burton, Henry A. Utility gun rack for boats and the like. 3,913,746, Cl. 211-64.000.

Buss, Dennis D.; and Reinberg, Alan R., to Texas Instruments Incorporated. Method of making charge-coupled devices. 3,914,127, Cl. 96-36.000.

Butler, Louis L., to Bear Manufacturing Corporation. Apparatus for determining wheel alignment. 3,913,236, Cl. 33-336.000.

Butt, Gerald L., to Stewart-Decatur Security Systems, Inc. Locking and unlocking mechanism for hinged doors. 3,913,263, Cl. 49-16.000.

Butts, Ernest O., to Hambro Structural Systems Ltd. End support shoe for composite joist. 3,913,296, Cl. 52-694.000.

Byatt, Dennis William George, to Marconi Company Limited, The. Liquid crystal display arrangements. 3,914,019, Cl. 350-160.0LC.

Byford, Derek Clark; and Mundye, Anthony Arnold John, to British Petroleum Company Limited, The. Synthetic lubricants for aero gas turbines. 3,914,179, Cl. 252-32.500.

C. G. Bevan Associates Limited: *See*—
Bevan, Christopher Graham, 3,914,359.

C. Reichert Optische Werke AG: *See*—
Dehlink, Alois F., 3,914,025.

Cable, Stephen J.; Fuller, Lee R.; and Hothem, John H., to Spartek Inc. Refractory protection shield for continuous flow furnaces. 3,914,099, Cl. 432-121.000.

Cableform Limited: *See*—
Morton, John; Stevens, Keith Drummond; and Thexton, Graham Spencer, 3,914,671.

Caldwell, Byron Lee, to Pacific Fence and Wire Company. Fireplace screen. 3,913,558, Cl. 126-139.000.

Calinter S.A.: *See*—
Charmes, Andre, 3,914,114.

Call, Donald H.; Atwood, Elbridge L.; Cary, Joseph A.; and Surette, James D. Mini sewage treatment system. 3,914,173, Cl. 210-5.000.

Callender, Russell J. Television chassis structure. 3,914,547, Cl. 178-7.900.

Cambio, Orlando D., Jr., to Respiratory Care, Inc. Humidifier. 3,913,843, Cl. 239-338.000.

Cambridge Wire Cloth Company: *See*—
Andrews, Donald E., 3,913,729.

Camp, John Walter Aldridge, to Ford Motor Company. Clutch release mechanism. 3,913,714, Cl. 192-995.000.

Campbell, Robert W.: *See*—
Hill, Harold Wayne, Jr.; and Campbell, Robert W., 3,914,150.

Canale, Raymond P.; and Ross, Wesley J., to Colt Industries Operating Corporation. Turbine engine control system. 3,913,316, Cl. 60-39.250.

Cannalonga, Marco Alfred; and Czarecki, Louis Vincent, to Hoffmann-La Roche Inc. Free-flowing, high density, agglomerated vitamin E powder compositions. 3,914,430, Cl. 424-284.000.

Canon Kabushiki Kaisha: *See*—
Komine, Yoshio, 3,914,034.
Sekiguchi, Takeshi, 3,914,787.
Sugiura, Yoji, 3,914,778.
Takano, Eiichi; Takesi, Kunio; and Matsumura, Isao, 3,914,032.
Tanabe, Akira; Tajima, Akira; and Kawamura, Naoto, 3,914,024

Canup, Robert E., to Texaco Inc. Ignition system employing controlled-duration continuous-wave high-frequency spark energy. 3,913,550, Cl. 123-148.00E.

Capetti, Federico: *See*—
Terzuolo, Giancarlo; and Capetti, Federico, 3,913,478.

Cappel, Bert; Schuhmann, Siegfried; and Wolf, Klaus, to Roland Offsetmaschinenfabrik Faber & Schleicher AG. Ink fountain having a continuous metering bar with zonal adjustment. 3,913,479, Cl. 101-365.000.

Cardinal, Daniel E., Jr. Vacuum conduit pick-up device. 3,913,307, Cl. 56-328.00R.

Cardwell Associates, Inc.: *See—*
Cardwell, Gilbert I., Jr., 3,914,550.

Cardwell, Gilbert I., Jr., to Cardwell Associates, Inc. Artificial speech device. 3,914,550, Cl. 179-1.0AL.

Caristi, Robert F.: *See—*
Friedman, Herbert W.; Caristi, Robert F.; and Morton, Richard G., 3,914,648.

Carl Freudenberg, Firma: *See—*
Graber, Adolf; and Tischer, Kurt, 3,914,493.

Carle, Ross G., to ACF Industries, Incorporated. Railway car cushioning device. 3,913,748, Cl. 213-8.000.

Carling O'Keefe Limited: *See—*
Dilanni, Daniel, 3,913,802.

Carlos, Donald D.; and Hicks, Darrell D., to Celanese Coatings & Specialties Company. Thermoset coatings from non-reactive polymers. 3,914,208, Cl. 260-86.10E.

Carlson, Curtis Raymond; Gorog, Istvan; and Heyman, Philip Michael, to RCA Corporation. Gated oscillator having constant average d.c. output voltage during on and off times. 3,914,711, Cl. 331-108.00D.

Carlson, David W.: *See—*
Anderson, Conroy D.; Carlson, David W.; Oleck, Stephen M.; and Stover, William A., 3,914,377.

Carlson, Harold W.: *See—*
Baldwin, Arden E.; Carlson, Harold W.; and Miers, Bruce W., 3,913,987.

Carlson, Richard G., to Allis-Chalmers Corporation. Control system for percentage of wheel slippage of a tractor. 3,913,680, Cl. 172-2.000.

Carlsson, Gote Allan: *See—*
Wastenson, Erik Goran; and Carlsson, Gote Allan, 3,913,707.

Carlton, Gordon: *See—*
Stirling, James Alexander; and Carlton, Gordon, 3,913,764.

Carmen, Kenneth, to Lawrence Peska Associates, Inc. Putting board for a baseball game. 3,913,915, Cl. 273-88.000.

Caron, Thomas E., to Nu-Vu Company of Wisconsin, Inc. Variable opacity light filtering apparatus for a welder's helmet. 3,914,027, Cl. 350-267.000.

Carpenter, George J., to American Optical Corporation. Nasopharyngoscope. 3,913,568, Cl. 128-11.000.

Carpenter, Rufus F. Combination card and dice game utilized with player mats. 3,913,919, Cl. 273-130.00H.

Carrier Corporation: *See—*
Barry, Vincent T., 3,913,342.
Damratowski, Leonard P., 3,913,621.

Carriere, Russell F., to Pettibone Corporation. Mobile side-reaching lifter. 3,913,767, Cl. 214-770.000.

Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., to Air Products and Chemicals, Inc. Method of preparing cellular foams using polymeric stabilizer of cyclic nitrogenous monomers. 3,914,188, Cl. 260-2.5AG.

Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., to Air Products and Chemicals, Inc. Method of preparing cellular foams using copolymeric stabilizers of selected nitrogenous monomers and esters of unsaturated dibasic acids. 3,914,190, Cl. 260-2.5AG.

Carson, Charles, to General Battery Corporation. Through-the-partition battery connections. 3,914,134, Cl. 136-134.00R.

Carter, John W., to Seats, Incorporated. Suspension seat. 3,913,975, Cl. 297-307.000.

Cary, Joseph A.: *See—*
Call, Donald H.; Atwood, Elbridge L.; Cary, Joseph A.; and Surette, James D., 3,914,173.

Casey, Thomas Patrick; Asal, Jerrold Ray; and Olthoff, James Alan, to Caterpillar Tractor Co. Implement mounting arrangement having lifting and angling capability. 3,913,684, Cl. 172-804.000.

Casio Computer Co., Ltd.: *See—*
Kashio, Toshio, 3,914,772.

Cason, John L., Jr.; and Shaw, Carl B., to United States of America, Energy Research and Development Administration. Neutron source. 3,914,612, Cl. 250-499.000.

Cass, Ann Elisabeth, to Continental Can Company, Inc. Resealable self-opening end unit. 3,913,782, Cl. 220-260.000.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, 3,914,523.

Castaigne, Albert Rene Joseph, to Centre d'Etudes pour L'Industrie Pharmaceutique. Process for the preparation of ,propargylamine. 3,914,312, Cl. 260-583.00H.

Castillo, Manuel, to Lawrence Peska Associates, Inc., a part interest. Bottle opener. 3,913,424, Cl. 81-3.440.

Castle, George K.: *See—*
Billing, Rudolph W.; and Castle, George K., 3,913,290.

Caterpillar Tractor Co.: *See—*
Baldwin, Arden E.; Carlson, Harold W.; and Miers, Bruce W., 3,913,987.
Casey, Thomas Patrick; Asal, Jerrold Ray; and Olthoff, James Alan, 3,913,684.
Clouse, Jerry A., 3,913,546.
Gee, James E.; Sieving, Alfred W.; and Ping, David T., 3,913,948.
Golan, Kenneth Frank, 3,913,416.
Grooss, Frank August; and Wagner, Rudolf, 3,913,768.
Herr, Charles H., 3,913,415.
Orr, Robert S.; and Fidler, Carl E., 3,913,985.
Sieving, Alfred William, 3,913,705.

Cathers, George I.; and Shipman, Calvin J. Volatilization of iodine ffom nitric acid using peroxide. 3,914,388, Cl. 423-249.000.

Caughlin, James Daniel; and Ozeroff, William John, to Caughlin, James Daniel. Vehicle brake and indicator light control system. 3,914,739, Cl. 340-72.000.

Cavell, Charles James: *See—*
Field, Michael Frank; and Cavell, Charles James, 3,913,369.

Celanese Coatings & Specialties Company: *See—*
Carlos, Donald D.; and Hicks, Darrell D., 3,914,208.

Celanese Corporation: *See—*
Hobbs, Charles C.; and van't Hof, Hendrik A., 3,914,296.
Park, Im Keun, 3,914,494.
Ram, Michael J.; and Di Edwardo, Andrew H., 3,914,393.

Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., to Pfizer Inc. 3-Methylthiorifamycins. 3,914,218, Cl. 260-239.30P.

Centers, Allen Dale, deceased (by Centers, Alta A., administratrix). Protective boot for horses. 3,913,302, Cl. 54-65.000.

Centers, Alta A., administratrix: *See—*
Centers, Allen Dale, deceased, 3,913,302.

Centre d'Etudes pour L'Industrie Pharmaceutique: *See—*
Castaigne, Albert Rene Joseph, 3,914,312.

Centre Electronique Horloger, S.A.: *See—*
Hammer, Walter; and Vittoz, Eric Andre, 3,914,706.

Century Mfg. Co.: *See—*
West, John C.; and Gunderson, Gary N., 3,914,726.

Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, to Western Electric Company, Inc. Method of monitoring the application of cellular plastic insulation to elongated conductive material. 3,914,357, Cl. 264-40.000.

Ceskoslovenska akademie ved: *See—*
Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, 3,914,341.

Chaikin, Malcolm; and Nossar, Mstislav, to Unisearch Limited. Apparatus for drying textile materials. 3,913,241, Cl. 34-122.000.

Champion International Corporation: *See—*
Benzing, James A., 3,913,300.
Vassiliades, Anthony E., 3,914,511.

Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, to Stauffer Chemical Company. Process for the production of N,N-diallyldichloroacetamide. 3,914,302, Cl. 260-561.0HL.

Chance, Leon H., to United States of America, Agriculture. Process for treating organic textiles with flame retardant polymers made from hydroxymethylphosphorus compounds and guanazoles. 3,914,106, Cl. 8-116.00P.

Chapman, Roger S., Jr. Structural system. 3,913,287, Cl. 52-94.000.

Chappell, Robert L.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred H., to International Flavors & Fragrances Inc. Bicyclic fragrance materials and processes therefor. 3,914,322, Cl. 260-617.00F.

Charmes, Andre, to Calinter S.A. Catalytic supports. 3,914,114, Cl. 29-183.500.

Chase Corporation: *See—*
Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., 3,914,495.

Chase, Edward L.: *See—*
Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., 3,914,495.

Chase, Francis M.: *See—*
Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., 3,914,495.

Chatourel, Pierre, to Regie Nationale Des Usines Renault. Arrangement for guiding the movable plate of a horizontal press in a machine for casting metals in a chill mold. 3,913,659, Cl. 164-303.000.

Checkpoint Systems, Inc.: *See—*
Bigelow, Arthur G.; Bigelow, Wilbur W.; and Stone, Gale E., 3,914,578.

Cheek, Tom F., Jr.: *See—*
Barton, James B.; and Cheek, Tom F., Jr., 3,914,748.

Chemsoil Corporation: *See—*
Collins, Dwight D., 3,913,677.

Chen, Nai Yuen: *See—*
Lucki, Stanley J.; Chen, Nai Yuen; and Bowes, Emerson, 3,914,331.

Chen, Yung Kong. Process for preparation of common mullet roe. 3,914,422, Cl. 426-248.000.

Cheng, Chia-Chung: *See—*
Zee-Cheng, Kwang Yuen; and Cheng, Chia-Chung, 3,914,424.

Cherdron, Egon: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Cherry, Kenneth Floyd. Sonic venturi vaporizor. 3,914,353, Cl. 261-1.000.

Chevron Research Company: *See—*
Brown, Melancthon S., deceased; and Kohn, Gustave K., administrator, 3,914,259.
Hughes, Thomas R., 3,914,330.
Magee, Philip S., 3,914,417.

Chia, Enrique; Hanegan, Herbert M.; and Keith, Paul S., to Southwire Company. Electrical contact device and method of preparation thereof. 3,914,009, Cl. 339-278.00C.

Chiarotto, Nereo. Fibrous composition of matter. 3,913,309, Cl. 57-144.000.

Chiba, Koji: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Chicago Bridge & Iron Company: *See—*
Paccione, James Dennis; and O'Meara, David Moore, 3,913,500.

Chikazoe, Yoshihisa: *See—*
Tugukuni, Hideyoshi; Kano, Masafumi; and Chikazoe, Yoshihisa, 3,914,335.

Childers, Billy M.; and Fesperman, Charles D., Jr., to RCA Corporation. Dyeing station in an apparatus for continuously dyeing fibrous material. 3,913,359, Cl. 68-183.000.

Childs, George William, deceased: *See—*
O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased, 3,914,577.

Childs, Patricia M., executrix: *See—*
O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased, 3,914,577.

Chisnall, David William. Toy. 3,913,262, Cl. 46-193.000.

Chiu, Shiu Tang, to Quebec Iron & Titanium Corporation-Fer et Titane du Quebec, Inc. Titanium carbide preparation. 3,914,113, Cl. 29-182.700.

Cho, Boong Youn; and Utt, Orval L., to Industrial Nucleonics Corporation. Thickness measuring apparatus and method for tire ply and similar materials. 3,914,607, Cl. 250-308.000.

Cho, Fan Pong, to Franciscan Enterprises, Inc. Intruder alarm system. 3,914,753, Cl. 340-258.00B.

Chromecek, Richard: *See—*
Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, 3,914,341.

Chynoweth, Lawrence L.; and Tech, Kurt O., to Cross Company, The. Control system for compensating for cutting machine tool wear. 3,914,678, Cl. 318-568.000.

Ciaffone, John T., to Warner-Lambert Company. Reel for storing an electrical line cord. 3,914,576, Cl. 219-214.000.

Ciba-Geigy AG: *See—*
Garnish, Edward William; and Haskins, Clifford George, 3,914,288.
Hiestand, Armin; and Jager, Horst, 3,914,225.
Somlo, Tibor; and Murphy, James, 3,914,263.

Ciba-Geigy Corporation: *See—*
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 3,914,212.
Dear, Robert Ernest Arthur; and Kleiner, Eduard Karl, 3,914,319.
Frick, Wilhelm Ernst; Weiss, Anton G.; Wenger, Thomas; and Traber, Walter, 3,914,310.
Fuchs, Helmut, 3,914,174.
Ilvespaa, Atso, 3,914,248.
Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, 3,914,239.
Schaffner, Karl; Meisels, Alex; Roger, Jean Claude; and Weis, Claus D., 3,914,222.
Schwarzenbach, Kurt; and Rosenberger, Siegfried, 3,914,344.
Woodward, Robert Burns, 3,914,258.

Cincinnati Milacron-Heald Corporation: *See—*
Hahn, Robert S.; and Lindsay, Richard P., 3,913,277.

Cincinnati Milacron Inc.: *See—*
McDonald, David Ian, 3,913,451.

Cities Service Oil Company: *See—*
Oliver, Don L., 3,913,352.

Clancy, Steven John, to Westinghouse Electric Corporation. Waveform generator including means for automatic slope calibration. 3,914,623, Cl. 307-229.000.

Clar, Milton. Apparatus for the compaction of refuse material and the like. 3,913,475, Cl. 100-245.000.

Clark, Charles R.: *See—*
Krehbiel, Delmar D.; Gregory, M. Duane; Clark, Charles R.; and Kennedy, Carl D., 3,913,674.

Clark Equipment Company: *See—*
Holmes, Donald E., 3,914,176.
Visser, Peter J.; and Miller, Richard C., 3,913,933.

Clark, Franklin F.; and Rickard, Robert S., to Amax Inc. Method of removing selenium from copper solution. 3,914,375, Cl. 423-43.000.

Clark, John Patrick: *See—*
Malcik, Frank John; Whittemore, Edward William; and Clark, John Patrick, 3,913,995.

Clark, John W. System and process for bacterial reduction of wastes. 3,914,164, Cl. 204-149.000.

Clark, Marion A. Bicycle with variable speed lever action drive. 3,913,945, Cl. 280-233.000.

Clarke, Maurice George, to Thorn Electrical Industries Limited. Manufacturing electric devices having sealed envelopes. 3,913,999, Cl. 316-4.000.

Clarke, Robert L.: *See—*
Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., 3,914,254.

Cleanglass Electric Washer Limited: *See—*
Durham, Charles E., 3,913,163.

Cleo Wrap Corporation: *See—*
Purdom, Clyde H.; Allum, Kenneth W.; and Shackelford, Harold D., 3,913,731.

Clevenger, Earl C.: *See—*
Savageau, Richard J.; Clevenger, Earl C.; and Anderson, Gordon C., 3,913,190.

Climax Manufacturing Co.: *See—*
Paige, Richard E., 3,913,824.

Clouse, Jerry A., to Caterpillar Tractor Company. Horsepower limiter and overfueling control mechanism. 3,913,546, Cl. 123-139.0ST.

Cobb, Albert H., Jr. Dynamic wheel and tire balancing apparatus. 3,913,980, Cl. 301-5.0BA.

Cobb, Leslie Hamilton; Mann, David; and Remmington, Timothy Alan, to Imperial Chemical Industries Limited. Method of producing metallized thermoplastic articles. 3,914,471, Cl. 427-250.000.

Coberley, Daniel A.; and Resh, Mark, to Altair, Hurletron. Display system and method for registration control equipment. 3,914,582, Cl. 235-92.0MP.

Coderre, William Michael; Berglund, Carl Neil; and Tillman, Philip Robert, to Northern Electric Company Limited. Electrical luminescent display devices. 3,914,642, Cl. 313-514.000.

Cogliano, Joseph A., to W. R. Grace & Co. Method of packaging. 3,913,298, Cl. 53-36.000.

Cohen, Jean: *See—*
Ballin, Gene, 3,913,178.

Coker, Charles Walter, Jr.; Hickox, Thomas A.; Lynott, John Joseph; and O'Rourke, Thomas Frank, to International Business Machines Corporation. Manually operated magnetic card encoder. 3,914,789, Cl. 360-2.000.

Coleman, Ceceil R.: *See—*
Shulman, N. Raphael; and Coleman, Ceceil R., 3,914,400.

Coleman, Michael G.: *See—*
Huffman, Tommie R.; and Coleman, Michael G., 3,914,137.

Coleson, Ronald Bruce; and Wood, Joel Paul, to Hytrac Conveyors Limited. Conveyor systems. 3,913,494, Cl. 104-172.00S.

Colgan, Francis L., to Raymond Lee Organization Inc., a part interest. Fish lure with exchangeable side panels. 3,913,257, Cl. 43-42.090.

Colgate-Palmolive Company: *See—*
Inamorato, Jack Thomas, 3,914,185.
Schaar, Charles H., 3,913,578.

Collins, Dwight D., to Chemsoil Corporation. Treatment of oil well strata. 3,913,677, Cl. 166-307.000.

Collins, Floyd K.; and Miller, John J., to GTE Sylvania Incorporated. Cathode structure for cathode ray tube. 3,914,638, Cl. 313-270.000.

Collins, Terence John, to Qonaar Corporation. Turnstile apparatus. 3,913,717, Cl. 194-16.000.

Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., to Comitato Nazionale per L'Energia Nucleare - CNEN. Process for producing bimetallic and polymetallic bodies in which the metallic components are joined together with metallurgical bond. 3,913,208, Cl. 29-417.000.

Colston, John R.: *See—*
Martin, Frank E.; Colston, John R.; and Smith, Norman E., 3,913,576.

Colt Industries Operating Corporation: *See—*
Canale, Raymond P.; and Ross, Wesley J., 3,913,316.

Comas, Enrique G.; and Root, Bernard H., to Stromberg-Carlson Corporation. Identification pulse synchronization in an automatic identification system. 3,914,555, Cl. 179-18.0FH.

Combustion Engineering, Inc.: *See—*
Harkness, Richard Ernest, 3,914,368.
Horlitz, Carl Frederick, Jr., 3,913,330.
von Hollen, Richard Frederick, 3,913,531.
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Vorwerk, Richard, 3,913,452.
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Ranger, Eugene, 3,913,752.

Combustion Unlimited Incorporated: *See—*
Straitz, John F., III, 3,914,095.

Comer, William T.: *See—*
Matier, William L.; and Comer, William T., 3,914,249.

Comitato Nazionale per L'Energia Nucleare - CNEN: *See—*
Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., 3,913,208.

Commissariat a l'Energie Atomique: *See—*
Costes, Didier, 3,913,960.
Hanff, Michel; Lions, Noel; and Peronnet, Jean, 3,913,407.
Saglio, Robert, 3,913,386.

Compagnie Francaise de Produits Industriels: *See—*
Askienazy, Alexandre; and Melki, Georges, 3,914,411.

Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
Verdier, Henri, 3,913,653.

Concast AG: *See—*
Schmid, Markus, 3,913,658.

Condon, John B.; and Harrington, Thomas L., to Minnesota Mining and Manufacturing Company. Method for marking paved surfaces. 3,914,468, Cl. 427-137.000.

Connelly Containers, Inc.: *See—*
Heaps, Harry D., Jr., 3,913,822.

Connin, John L.: *See—*
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., 3,914,047.

Continental Can Company, Inc.: *See—*
Cass, Ann Elisabeth, 3,913,782.

Continental Oil Company: *See—*
Brooks, Robert A., 3,914,686.
Gordon, Ronnie D., 3,914,252.
Gordon, Ronnie D., 3,914,320.
Johnson, Morris A.; and Yang, Kang, 3,914,327.
Krehbiel, Delmar D.; Gregory, M. Duane; Clark, Charles R.; and Kennedy, Carl D., 3,913,674.

Scott, William P.; and Swartz, Charles J., 3,913,992.
Starks, Charles M.; and Portwood, Owen, Jr., 3,914,272.
Sweeney, William T., 3,913,401.

Continental Specialties Corporation: *See—*
Seidler, Jack, 3,914,007.

Control Data Corporation: *See—*
Beecroft, Harold James, 3,914,792.

Conwed Corporation: *See—*
Larsen, Ronald Leslie, 3,913,510.
Videen, Otis R., 3,914,498.

Conwell, Phillip J. Unitary auxiliary electric power, steam supply and heating plant for building construction. 3,913,331, Cl. 60-692.000.

Cooksey, John Andrew, to Singer Company, The. Deflection amplifier. 3,914,654, Cl. 315-408.000.

Coon, James A. Method and means for making file teeth. 3,913,420, Cl. 76-13.000.

Cooper, Alfred. Safety closure cap with retaining feet. 3,913,783, Cl. 220-300.000.

Cooper, Donald Walter; and Unruh, James Bradley, to International Business Machines Corporation. System and method for aligning textual character fields. 3,914,745, Cl. 340-172.500.

Cooper, John A.: *See—*
Brown, Jasper H.; Cooper, John A.; and Morgan, Albert W., 3,914,503.

Cooper, Julius, to Ideal Toy Corporation. Tug of war game. 3,913,914, Cl. 273-85.00R.

Cooper, Roydon B., to Pall Corporation. Flat-lapped valve cartridge assembly with caged poppet. 3,913,615, Cl. 137-543.190.

Copolymer Rubber & Chemical Corporation: *See—*
Johansson, Anders H.; and Bond, William C., Jr., 3,914,478.

Copp, Donald G.; Ellsworth, James C.; and Mosher, Charles E., to Indian Head, Inc. Ceiling box for electrical outlets. 3,913,773, Cl. 220-3.920.

Coppola, Theodore Anthony: *See—*
Hollander, Betty Ruth; Coppola, Theodore Anthony; and McKinley, William Earl, 3,914,008.

Corbel, Ange, to Thomson-CSF. Very high voltage power supply generating a recurrent stepped voltage. 3,914,617, Cl. 307-56.000.

Corbett, James C. Toy bubble generator. 3,913,260, Cl. 46-8.000.

Coronelli, Carolina: *See—*
Pagani, Hermes; Coronelli, Carolina; Bardone, Maria Rosa; and Lancini, Giancarlo, 3,914,257.

Corsi, George L.: *See—*
Barefoot, Gerald A.; and Corsi, George L., 3,913,924.

Costantini, Michel: *See—*
Brunie, Jean Claude; Costantini, Michel; Crenne, Noel; and Joufret, Michel, 3,914,292.

Costes, Didier, to Commissariat a l'Energie Atomique. Clamping system for the lid of a pressurized enclosure. 3,913,960, Cl. 292-256.650.

Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio) S.n.c.: *See—*
Lonati, Francesco, 3,913,357.

Cottingham, Hugh: *See—*
Scrocco, Joseph; and Cottingham, Hugh, 3,913,769.

Coucher, Robert G.; and Taylor, Edward, to EPPCO. Pulsating powder metering and dispensing device. 3,913,795, Cl. 222-194.000.

Coulson, Dale Robert, to Du Pont de Nemours, E. I., and Company. Preparation of aromatic secondary and tertiary amines using a nickel complex catalyst. 3,914,311, Cl. 260-577.000.

Cowan, Wavell Frederick: *See—*
McGurk, Stanley E.; and Cowan, Wavell Frederick, 3,914,172.

Cox, Bruce M., to Halliburton Company. Method and apparatus for monitoring and controlling the composition of flammable gas mixtures. 3,913,600, Cl. 137-6.000.

Cox, Vernon Frederick: *See—*
Fox, Roger Geoffrey; and Cox, Vernon Frederick, 3,913,318.

Coxon, Philip. Stabilisers. 3,913,917, Cl. 273-106.50C.

CPC International Inc.: *See—*
Daniher, Francis A.; and Visek, Kenneth E., 3,914,303.

Craft, Jack, to RCA Corporation. Feedback amplifier. 3,914,704, Cl. 330-18.000.

Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., to Merck & Co., Inc. 5-Oxo-6-substituted-cyclopent-[f]-indole-2-carboxylic acids. 3,914,253, Cl. 260-326.13R.

Crandall, William B.: *See—*
Harada, Yoshiro; and Crandall, William B., 3,914,184.

Crane Air Trac Incorporated: *See—*
Cullen, Patrick F., 3,913,470.

Crawley, Barry G., to Hobrough Limited. Automatic orthophoto printer and display including position error compensation for photopositioning transport. 3,914,051, Cl. 356-2.000.

Creegan, Robert M.; and White, Daniel J., to Dennison Manufacturing Company. Pressure sensitive adhesive labels and method of making. 3,914,484, Cl. 428-42.000.

Crenne, Noel: *See—*
Brunie, Jean Claude; Costantini, Michel; Crenne, Noel; and Joufret, Michel, 3,914,292.

Crinospital S.p.A.: *See—*
Moulet, Camille, 3,913,882.

Crisafulli, Peter G., to V-8 Electronic Ignition Co. Inductor current relay switch. 3,913,549, Cl. 123-148.00E.

Croft, Jimmy L.: *See—*
Morris, Earl F.; and Croft, Jimmy L., 3,913,256.

Cronin, Timothy H.; and Hess, Hans-Jurgen E., to Pfizer Inc. Quinazoline and isoquinoline bronchodilators. 3,914,423, Cl. 424-250.000.

Crosby, John: *See—*
Rennie, Robert Allan Campbell; Crosby, John; and Paton, Robert Michael, 3,914,267.

Crosher, Frederick K.: *See—*
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, 3,914,464.

Cross, Barrington; and Grasso, Charles Paul, to American Cyanamid Company. (Alkynyloxy)alkyl and (alkenyloxy)alkyl carbamates. 3,914,285, Cl. 260-471.00C.

Cross Company, The: *See—*
Chynoweth, Lawrence L.; and Tech, Kurt O., 3,914,678.

Crouch, Donald W.; Kurtz, Donald R.; and Sofianek, Joseph C., to General Electric Company. High-voltage vacuum switch. 3,914,568, Cl. 200-144.00B.

Crowley, Thomas E.: *See—*
Ernest, Robert P.; Ahrns, Daniel C.; Crowley, Thomas E.; and Ounsted, Edwin J., 3,913,198.

Crucible Inc.: *See—*
Darr, William H., Sr., 3,913,276.

Crumbliss, Robert T.; and Hendricks, Jerry V., to Singer Company, The. Staggered needle cut-pile tufting machine. 3,913,505, Cl. 112-79.00R.

Crummett, Donald L., to Halliburton Company. Coupler pin retainer. 3,913,747, Cl. 213-8.000.

Csejka, David A.: *See—*
Sawyer, Arthur W.; and Csejka, David A., 3,914,275.

CSELT - Centro Studi e Laboratori Telecomunicazioni SpA: *See—*
Giusto, Pietro Porzio, 3,914,695.
Melindo, Flavio; and Perucca, Giovanni, 3,914,553.

Cullen, Patrick F., to Crane Air Trac Incorporated. Ventilating system for traveling crane cabs, exhaust hoods and the like. 3,913,470, Cl. 98-115.0VM.

Cullen, Walter P.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 3,914,218.

Cunningham, William J.; Sweeney, Richard F.; Yao, Charles C. Y.; and Anello, Louis G., to Allied Chemical Corporation. Catalyzed decomposition of vic-diiodoperhaloalkanes. 3,914,326, Cl. 260-653.500.

Currie, James R., to United States of America, General Counsel - Code GP. Voltage controlled oscillator having frequency varying inversely with control voltage. 3,914,712, Cl. 331-111.000.

Curtis, Ivan, to Marley Tile A.G. Surface covering materials. 3,914,485, Cl. 428-71.000.

Curtis, M. Rex, deceased, to Schlumberger Technology Corporation. Apparatus and method for determining fluid flow rates from temperature log data. 3,913,398, Cl. 73-154.000.

Curtiss-Wright Corporation: *See—*
Leto, Anthony, 3,914,067.

Cutler-Hammer, Inc.: *See—*
Mallonen, Edward A., 3,914,722.

Czarecki, Louis Vincent: *See—*
Cannalonga, Marco Alfred; and Czarecki, Louis Vincent, 3,914,430.

Czerniejewski, Francis R., to Westinghouse Electric Corporation. Training simulator for nuclear power plant reactor control model and method. 3,914,794, Cl. 444-1.000.

Dahar, Alex J., to Air Preheater Company, Inc., The. Air supply for incinerator. 3,913,501, Cl. 110-8.00R.

Dahl, Klaus J., to Raychem Corporation. Biphenylyloxybenzoyl halides. 3,914,298, Cl. 260-544.00M.

Dai Nippon Toryo Co., Ltd.: *See—*
Tugukuni, Hideyoshi; Kano, Masafumi; and Chikazoe, Yoshihisa, 3,914,335.

Daiichi Seiyaku Co., Ltd.: *See—*
Yamakami, Kiyoshi; Akazawa, Osamu; Shibata, Yoshiyuki; and Fujimoto, Nichio, 3,914,280.

Daimler-Benz Aktiengesellschaft: *See—*
Ableitner, Erich; and Ott, Burkhard, 3,913,538.
Kramer, Willi; and Schanzer, Hans-Peter, 3,913,468.
Supper, Ottmar, 3,913,834.

Dale, Frank L. Ambulant feed dispenser having angularly disposed auger. 3,913,794, Cl. 222-178.000.

Damratowski, Leonard P., to Carrier Corporation. Linear valve control mechanism. 3,913,621, Cl. 137-630.200.

Dana Corporation: *See—*
Fusiek, Michael P., 3,914,490.

Dandliker, Rene: *See—*
Mottier, Francois M.; and Dandliker, Rene, 3,914,056.

Dandliker, Walter B., to Kay Laboratories, Inc. Constant temperature device. 3,913,559, Cl. 126-263.000.

Daniel, William E. Mobile tire shredder. 3,913,850, Cl. 241-101.700.

Daniher, Francis A.; and Visek, Kenneth E., to CPC International Inc. Preparation of N,N-dialkylacylamides. 3,914,303, Cl. 260-561.00N.

Danneberg, Peter: *See—*
Bauer, Adolf; Weber, Karl-Heinz; Danneberg, Peter; and Kuhn, Franz-Josef, 3,914,216.

Darr, William H., Sr., to Crucible Inc. Apparatus for grinding agricultural discs. 3,913,276, Cl. 51-108.0BS.

D'Assuncao, Jean-Bernard, to Eaton Corporation. Liquid dispenser. 3,913,793, Cl. 222-165.000.

Data Time, Inc.: *See—*
Hunt, Theodore R., 3,914,551.

Daum, Sol J.: *See—*
Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., 3,914,254.

Dauner, Bertram Wilhelm-Georg; Marx, Helmut Hermann; and Wolfram, Karl-Heinz Arno, to Koenig & Bauer Aktiengesellschaft. Device for locking up flexible printing plates on forme cylinders of printing presses. 3,913,480, Cl. 101-415.100.

David, Bernard E.: *See—*
Bletry, Pierre C.; and David, Bernard E., 3,914,474.

Davidson, Raymond John, to Nilux Holding Societe Anonyme. Segregation process for beneficiating nickel, copper, or cobalt oxidic ore. 3,914,123, Cl. 75-1.000.

Davis, Edwin R. Auto pollution gasoline tank cap assembly. 3,913,639, Cl. 141-285.000.

Davis, George B., Jr. Caulking gun adapter for electric hand drill. 3,913,799, Cl. 222-326.000.

Davis, Leonard C., to General Motors Corporation. Regenerator drive assembly. 3,913,662, Cl. 165-8.000.

Davis, Richard A.: *See—*
Rutten, Donald E.; and Davis, Richard A., 3,913,528.

Davy Powergas Limited: *See—*
Wood, William Laurence, 3,914,277.

Day, James E. Floss holder. 3,913,597, Cl. 132-92.00R.

Dayco Corporation: *See—*
Holden, Homer N.; Shokler, Morris; and Lamden, Sidney K., 3,913,622.

de Bruyne Norman Adrian. Oscillatory stirring apparatus. 3,913,895, Cl. 259-118.000.

Deacon, Scott C. Wheelchair lift. 3,913,759, Cl. 214-77.00R.

Deal, Jerry E.: *See—*
Arrington, Earl J.; Deal, Jerry E.; and Hunsaker, Roger C., 3,914,069.

Dean, Donald E.; and Alesi, John, Jr., to Formex Manufacturing, Inc. Abstract having product ejection means for forming plastic. 3,914,103, Cl. 425-397.000.

Dean, Donald E.; and Alesi, John, Jr., to Formex Manufacturing, Inc. Apparatus having safety means for forming plastic sheets. 3,914,104, Cl. 425-397.000.

Dean, Frank J., Jr., to Tempmaster Corporation. Aspirating thermostat. 3,913,832, Cl. 236-49.000.

Dear, Robert Ernest Arthur; and Kleiner, Eduard Karl, to Ciba-Geigy Corporation. Bisthioalkyl glycols. 3,914,319, Cl. 260-609.00R.

De Crescente, Michael A.: *See—*
Brennan, John J.; Novak, Richard C.; and De Crescente, Michael A., 3,914,500.

Deere & Company: *See—*
Brooks, Roger Dean, 3,913,395.
Freiburger, Thomas William, 3,913,414.
Koch, James Allan; Nelson, Roger John; and Henderson, Donald LeRoy, 3,913,449.
Lohr, Thomas Herbert; and Scholten, Stephen Clair, 3,913,692.
Meiers, Gerald Franklyn, 3,913,473.
Miller, Wayne Russel; and Lucke, Robert James, Jr., 3,913,324.
Nelson, Roger John, 3,913,454.
Parquet, Donald James, 3,913,453.
Talak, John Frank, 3,913,831.
Teja, Mohindar Singh, 3,913,955.
Williams, Lary Lynn, 3,913,701.

Deguchi, Takashi: *See—*
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.

Dehlink, Alois F., to C. Reichert Optische Werke AG. Microscope condenser. 3,914,025, Cl. 350-229.000.

Dekking, Henri G. G., to General Tire & Rubber Company, The. Block copolymerization with azoamidino compounds as initiator. 3,914,340, Cl. 260-884.000.

Delano, Richard; and Raseman, Chad J. Method of controlling solar heat and light in green houses. 3,914,469, Cl. 427-164.000.

Del Val, Sagrario Mochales: *See—*
Hendlin, David; Stapley, Edward O.; Del Val, Sagrario Mochales; and Mata, Justo Martinez, 3,914,231.

DEMAG Aktiengesellschaft: *See—*
Becker, Klaus; and Sprung, Hartwig, 3,913,712.

Dembiak, Matthew R.; and Glosek, John J., to Western Electric Co., Inc. Methods of and apparatus for controlling the thickness of an annular extrusion. 3,914,356, Cl. 264-40.000.

Deneke, Karlheinz; and Paas, Hans, to Opti-Holding AG. Slide-fastener package and process for making same. 3,913,297, Cl. 53-32.000.

Dennison Manufacturing Company: *See—*
Creegan, Robert M.; and White, Daniel J., 3,914,484.

de Panafieu, Philippe: *See—*
Brun, Andre; Jaffe, Albert; and de Panafieu, Philippe, 3,913,669.

DeShazer, Larry G., to Union Carbide Corporation. Yttrium orthovanadate optical polarizer. 3,914,018, Cl. 350-157.000.

Desmarchais, Walter E.: *See—*
Shallenberger, John M.; Hornak, Leonard P.; and Desmarchais, Walter E., 3,914,613.

DeSoto, Inc.: *See—*
Gaske, Joseph E., 3,914,165.

Desty, Denis Henry; and Lunn, Howard Cervase, to British Petroleum Company Limited, The. Distributor plate. 3,914,089, Cl. 431-7.000.

Deutsch, Ralph, to Nippon Gakki Seizo Kabushiki Kaisha. Voicing for a computor organ. 3,913,442, Cl. 84-1.190.

Devlin, Barry R. J.: *See—*
Entwistle, Ian D.; Williams, Peter J.; and Devlin, Barry R. J., 3,914,244.

Dewhirst, Roy: *See—*
Martone, Ronald J.; Goldman, Samuel C.; and Dewhirst, Roy, 3,914,614.

Dhondt, Prosper E., to Fabrique Nationale Herstal S.A. Variable gauge transfer device for rib border knitting machine. 3,913,358, Cl. 66-148.000.

Diamond, Julius: *See—*
Douglas, George H.; and Diamond, Julius, 3,914,306.

Di Cicco, Peter A. Rotary plug valve. 3,913,886, Cl. 251-215.000.

Dickason, Alan F., to Sun Ventures, Inc. Oxidative dehydrogenation of butane. 3,914,332, Cl. 260-680.00E.

Dickinson, Ian James: *See—*
Brooke, Peter Howard; Dickinson, Ian James; Kavanagh, David Cecil; and Smith, Colin, 3,914,118.

Di Edwardo, Andrew H.: *See—*
Ram, Michael J.; and Di Edwardo, Andrew H., 3,914,393.

Diemer, Willem Hildebrand; Zwep, Gerrit; and Mulder, Jan, to U.S. Philips Corporation. X-ray tube comprising a liquid-cooled anode. 3,914,633, Cl. 313-32.000.

Diersing, Raymond A.: *See—*
Reed, Ronald H.; and Diersing, Raymond A., 3,914,564.

Diez, Adolf, to Karl Schmidt GmbH. Chill mold for casting pistons. 3,913,660, Cl. 164-348.000.

Dilanni, Daniel, to Carling O'Keefe Limited. Decanting device for decanting the liquid contents of decapped bottles. 3,913,802, Cl. 222-400.700.

Dilger, Lawrence. Metering system and control therefor. 3,913,787, Cl. 222-26.000.

Dillenburg, Helmut; Honig, Helmut; and Fuchs, Paul-Wilhelm, to Peroxid-Chemie GmbH. Process for the production of particles of sodium perborate monohydrate having an increase resistance to abrasion. 3,914,380, Cl. 423-279.000.

Dixon, George D.; and Nelson, Hugh A., to Westinghouse Electric Corporation. Method of improving the finish of the bores of a reverse osmosis sand module. 3,914,358, Cl. 264-41.000.

Doane, William M.: *See—*
Trimnell, Donald; Shasha, Baruch S.; and Doane, William M., 3,914,214.

Doe, Walter P., to Quaker Oats Company, The. Toy figure. 3,913,261, Cl. 46-98.000.

Doherty, Thomas E.: *See—*
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,914,152.

Domenighetti, Domenico. Multi-compacting machine comprising three or more interarticulated units for soil tamping. 3,914,065, Cl. 404-123.000.

Dominion Engineering Works, Limited: *See—*
Field, Michael Frank; and Cavell, Charles James, 3,913,369.

Donoghue, John Francis: *See—*
Wilhelm, Robert G., Jr.; and Donoghue, John Francis, 3,914,585.

Dornier System GmbH: *See—*
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,902.
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,991.

Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., to General Motors Corporation. Positive selective nickel alignment system. 3,914,050, Cl. 355-133.000.

Dotzauer, Willi: *See—*
Keller, Dieter; Kuhn, Rudolf; and Dotzauer, Willi, 3,913,301.

Doucette, Robert J.: *See—*
Pyle, Wayne E.; and Doucette, Robert J., 3,913,202.

Dougherty, Timothy Stephen: *See—*
Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, 3,914,357.

Douglas, George H.; and Diamond, Julius, to William H. Rorer, Inc. Guanidines. 3,914,306, Cl. 260-562.00R.

Douglas, Joseph Daniel: *See—*
Madonian, Vahe Samuel; and Douglas, Joseph Daniel, 3,914,676.

Dow Chemical Company, The: *See—*
Dunbar, Joseph E.; and Bohnert, Thomas J., 3,914,316.
Edamura, Fred Y., 3,914,228.
Gunderman, Roland E.; and Newman, Ritchey O., Jr., 3,914,360.
Ivy, John B.; Willis, Gordon G.; and Kelsoe, David C., 3,914,167.
Kruelskie, Donald A., 3,914,085.
Langer, Horst G., 3,914,404.
Loeffler, Norman Raymond, 3,914,196.
Mitchell, John H., 3,914,342.
Olstowski, Franciszek, 3,914,198.
Shelley, Ralph Ray, Jr., 3,914,202.
Smith, Harry A., 3,914,194.

Dow Corning Corporation: *See—*
Lee, Chi-Long; and Schulz, Jay R., 3,914,199.
Newash, Mahmoud S., 3,913,587.

Downing, Noel L., to General Motors Corporation. Vane actuation system. 3,914,066, Cl. 415-151.000.

Doyle, Barbara J. Thermometer Pacifier. 3,913,402, Cl. 73-343.00R.

Doyle, William C., Jr., to Gulf Research & Development Company. Selectively herbicidal 2-substituted -4H-3,1-benzoxazin-4-ones. 3,914,121, Cl. 71-90.000.

Dravo Corporation: *See—*
Engelleitner, William H.; and Floyd, Samuel B., Jr., 3,914,364.
Selmeczi, Joseph G., 3,914,378.

Dreis & Krump Manufacturing Co.: *See—*
MacGregor, Robert, 3,913,450.

Dresser Industries, Inc.: *See*—
Gullett, James Thomas, 3,914,384.
Smyrl, Kenneth E., 3,913,675.

Dressler, Oliver Roderick. Siphon disc. 3,913,640, Cl. 141-392.000.

Dreyer, John F., to Minnesota Mining and Manufacturing Company. Production of gradient density liquid crystal filter. 3,914,016, Cl. 350-155.000.

Dreyfus, Russell Warren; and Hodgson, Rodney Trevor, to International Business Machines Corporation. High brightness ion source. 3,914,655, Cl. 317-4.000.

Driltech, Inc.: *See*—
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,753.
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,754.

Drinkard, William F., Jr.; and Brown, Henry S., to Mineral Research & Development Corporation. Recovery of metal and sulfate values from electrochemical mining electrolytes. 3,914,163, Cl. 204-105.00R.

Driskell, Thomas D.; Heller, Alfred L.; and Koenigs, Joseph F., to Miter, Inc. Dental treatments. 3,913,229, Cl. 32-15.000.

Droll Yankees, Inc.: *See*—
Kilham, Peter, 3,913,527.

Drubig, Horst, to Siemens Aktiengesellschaft. Automatic protective circuit breaker. 3,914,720, Cl. 335-14.000.

Ducato, Aldo: *See*—
Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, 3,914,396.

Ducloux, Maurice; and Gruffax, Max, to Rhone-Poulenc, S.A. Phenolic solutions of imide-amide polymers. 3,914,505, Cl. 428-379.000.

Dudar, Walter H. Vehicle tire inflating system. 3,913,632, Cl. 141-95.000.

Duffaut nee Paumont, Marie Irene: *See*—
Gueyne, Charles Henri Jean; and Duffaut nee Paumont, Marie Irene, 3,914,416.

Dujack, George M.: *See*—
Modic, Frank J.; and Dujack, George M., 3,914,369.

Dulien, Frederick M.; and Wohl, Lawrence S. Flexible metal duckboard flooring. 3,913,291, Cl. 52-403.000.

Dull, Hans-Jurgen, to Siemens Aktiengesellschaft. Switch for a magnetic suspension railroad. 3,913,492, Cl. 104-130.000.

Dunbar, Joseph E.; and Bohnert, Thomas J., to Dow Chemical Company, The. Preparation of 2-(sulfur-substituted)-3-hydroxy-5,5-dimethyl-2-cyclohexen-1-ones. 3,914,316, Cl. 260-586.00R.

Dunetz, Bryant R.; and Kronman, Seymour, to United States of America, Army. Ballistic disc. 3,913,488, Cl. 102-92.100.

Dunham Bush, Inc.: *See*—
Moody, Harold W., Jr.; and Hamilton, Clark B., 3,913,346.

Dunlop Holdings Limited: *See*—
French, Tom, 3,913,654.

Dunlop Limited: *See*—
Ball, Eric, 3,913,624.
Bates, Gregory John, 3,913,940.

Du Pont de Nemours, E. I., and Company: *See*—
Anderson, Thomas Jon, 3,914,386.
Begland, Robert Walter, 3,914,276.
Begland, Robert Walter, 3,914,279.
Coulson, Dale Robert, 3,914,311.
Faust, Carl Raymond, 3,914,398.
Gorrafa, Adly Abdel-Moniem, 3,914,488.
Haskell, Vernon Charles, 3,914,518.
Hawkins, Curtis Owen, 3,913,421.
Horowitz, Samuel Jacob, 3,914,169.
Hyson, Archibald Miller, 3,914,230.
Jewell, Richard A., 3,914,224.
Middleton, William Joseph, 3,914,265.
Nersasian, Arthur, 3,914,269.
Newcomer, Michael Paul, 3,914,130.
Scheiber, David Hitz; and Weaver, Richard Vroman, 3,914,128.
Sheppard, William Arthur, 3,914,247.
Smedberg, George Elmer, 3,914,489.

Dura Corporation: *See*—
Longworth, William F.; and Tamas, Attila J., 3,913,937.

Durbin, David R. Container for hollow cylindrical or generally toroidal parts. 3,913,735, Cl. 206-303.000.

Durham, Charles E., to Cleanglass Electric Washer Limited. Devices for cleaning glasses and other drinking vessels. 3,913,163, Cl. 15-75.000.

Durkoppwerke GmbH: *See*—
Pollmeier, Konrad, 3,913,507.

Durschner, Rolf, to Siemens Aktiengesellschaft. Bearing for the support of the inner conductor of an encapsulated tubular line support in a support insulator. 3,914,530, Cl. 174-28.000.

Dyba, John J.; and Ackerman, Carl F., to Anaconda Company, The. Sector cable. 3,914,532, Cl. 174-119.00R.

Dyer, Glenn L. Automotive power system. 3,913,699, Cl. 180-66.00C.

Dyer, Robert E.: *See*—
Finlay, Alexander, Jr.; Dyer, Robert E.; and Kessler, William D., 3,914,757.

Dyment, John Cameron; and Schwartz, Bertram, to Bell Telephone Laboratories, Incorporated. Surface passivation of GaAs junction laser devices. 3,914,465, Cl. 427-82.000.

Dynamic Air Inc.: *See*—
Steele, James R., 3,913,891.

Dynamit Nobel Aktiengesellschaft: *See*—
Wienand, Michael; Jensen, Klaus; Primessing, Franz; and Alfter, Franz-Werner, 3,914,147.

E.I. Du Pont de Nemours & Company: *See*—
Hyson, Archibald Miller, 3,914,122.

E. R. Squibb & Sons, Inc.: *See*—
Bernstein, Jack; and Sowinski, Francis Alexander, 3,914,294.
Treuner, Uwe D.; and Breuer, Hermann, 3,914,221.

E. W. Scripps Company, The: *See*—
Niehaus, William R., 3,914,788.

Eagle Iron Works: *See*—
McCauley, Porter Thompson, 3,913,788.

Earth Chemical Company, Limited: *See*—
Nishimura, Akira; Akamatsu, Hiroshi; Negoro, Sentaro; and Yoshida, Yasutoshi, 3,913,259.

Eary, George Daniel, Sr. Adjustable head and shoulder rest. 3,913,155, Cl. 5-327.000.

Eastman Kodak Company: *See*—
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., 3,914,047.
Martin, James C.; Meen, Ronald H.; and Lewis, Howard M., 3,914,229.
Morse, John E., 3,913,813.
Pollock, John S., 3,914,721.
Tucker, Archie J., 3,913,737.
Wurl, Donald R., 3,914,097.
Wylot, James Matthew; and Greco, Edgar Joseph, 3,914,129.

Eaton Corporation: *See*—
D'Assuncao, Jean-Bernard, 3,913,793.

Eberle, Fritz: *See*—
Koplow, Harold Stanley; Eberle, Fritz; Ho, Shu-Kuang; and Lesnick, Edward, 3,913,721.

Ebner, Cuno; and Schuler, Max, to Sandoz Ltd. 5-Chloropyridazones. 3,914,226, Cl. 260-250.00A.

Ebner, Peter R.: *See*—
Griffith, Louis E.; and Ebner, Peter R., 3,914,774.

Ecodyne Corporation: *See*—
Gobler, Harry W.; and Grotheer, Robert, 3,913,881.

Edamura, Fred Y., to Dow Chemical Company, The. 6-(Substituted phenoxy)tetrazolo(1,5-b)pyridazines. 3,914,228, Cl. 260-250.0AC.

Edison Price, Inc.: *See*—
Goodbar, Isaac, 3,914,723.

Edouard Dubied et Cie (Societe Anonyme): *See*—
Kohler, Fritz; and Perotti, Andre, 3,913,354.

Educational & Commercial Avcom Inc.: *See*—
Li Donnici, Kenneth, 3,914,645.

Edwards, Thomas C., to Rovac Corporation, The. Air conditioning system having reduced driving requirement. 3,913,351, Cl. 62-402.000.

Edwin Cooper & Company Limited: *See*—
Elliott, John Scotchford; Jayne, Gerald John Joseph; and Barber, Rodney Ian, 3,914,241.

Eggington, Wilfred James, to Litton Systems, Inc. Air cushion vehicle cell having rigid base. 3,913,704, Cl. 180-121.000.

Egli, Christian: *See*—
Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, 3,914,239.

Ehman, Michael F., to Rockwell International Corporation. Mercury sulfide films and method of growth. 3,914,525, Cl. 428-539.000.

Ehret, Gordon F.: *See*—
Rowley, William N.; and Ehret, Gordon F., 3,914,072.

Ehret, Yale W.; and Niessner, Adam, to Adams & Westlake Company, The. Hinged window with safety release mechanism. 3,913,265, Cl. 49-141.000.

Eibe, Werner W., to Blaw-Knox Foundry & Mill Machinery, Inc. Tandem rolling mill. 3,913,368, Cl. 72-234.000.

Eichenberger, Kurt: *See*—
Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, 3,914,239.

Eichler, Walter, to Elektophysikalische Anstalt Bernard Berghaus. Power supplying device for the operation of a gas discharge container. 3,914,575, Cl. 219-121.00P.

Eidelberg, Jonah; and Mooney, Thomas. Fitting for conduit and electrical cable. 3,913,956, Cl. 285-343.000.

Eikvar, Tore, to Minnesota Mining and Manufacturing Company. Diffusion transfer element and method of using same. 3,914,125, Cl. 96-1.00E.

Einem, Robert E.; and Vertefeuille, Raymond, to International Telephone and Telegraph Corporation. Decade or the like and components thereof. 3,914,583, Cl. 235-92.00C.

Eisenberg, Bernard C., to Solbern Corporation. Machine for filling containers with granular products. 3,913,634, Cl. 141-51.000.

Eklund, Phillip R., to United States of America, Air Force. Polytetrafluoroethylene-lined bearing improvement. 3,913,990, Cl. 308-72.000.

Electrostatic Equipment Corporation: *See*—
Goodridge, William C., 3,914,461.

Elektophysikalische Anstalt Bernard Berghaus: *See*—
Eichler, Walter, 3,914,575.

Eli Lilly and Company: *See*—
Sharabash, Moustafa M., 3,914,401.

Elliot, George, to British Secretary of State for Trade and Industry. Monitoring system for moored floating vessels. 3,913,396, Cl. 73-143.000.

Elliott, James E., to MCA Disco-Vision, Inc. Video disc player. 3,914,541, Cl. 178-6.60R.

Elliott, John Scotchford; Jayne, Gerald John Joseph; and Barber, Rodney Ian, to Edwin Cooper & Company Limited. Oil soluble derivatives of 2,5-di-mercapto-1,3,4-thiadiazole and process for preparation thereof. 3,914,241, Cl. 260-302.00E.

Ellis, Christopher Ian Arthur. Cleansing by laundering and like processes. 3,914,107, Cl. 8-158.000.

Ellis, Stephen Robert Mercer: *See—*
McKeown, Kevin Joseph; Ellis, Stephen Robert Mercer; and Priestley, Ronald, 3,914,351.

Ellsworth, James C.: *See—*
Copp, Donald G.; Ellsworth, James C.; and Mosher, Charles E., 3,913,773.

Elresor SA: *See—*
Hetzel, Max, 3,914,719.

Eltra Corporation: *See—*
Van Gilder, Burrows C., 3,914,685.

Emerson Electric Co.: *See—*
Kieffer, Vernon E., 3,913,629.

Emerson, Sidney Thomas: *See—*
Barnes, Elwood Eugene; Emerson, Sidney Thomas; Rogers, Paul Clifton; and Simpson, Wilburn Dwain, 3,914,747.

Emery Industries, Inc.: *See—*
Hutchison, Robert B., 3,914,131.

Emhart Corporation: *See—*
Foster, Thomas Vincent, 3,914,120.

Empire Automotive, Inc.: *See—*
Green, Hal, 3,913,971.

Enck, Richard S., Jr.; Goehner, Ronald H.; and Guy, Gordon Noel, to Varian Associates. Photomultiplier with reduced dark current. 3,914,599, Cl. 250-207.000.

Endo Laboratories: *See—*
Rajagopalan, Parthasarathi, 3,914,421.

Engel, Christopher M., to Zenith Radio Corporation. Automatic contrast control utilizing three control signals. 3,914,545, Cl. 178-7.50R.

Engelhard Minerals & Chemicals Corporation: *See—*
Pfefferle, William C., 3,914,090.

Engelhardt, Albrecht: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, 3,914,432.

Engelleitner, William H.; and Floyd, Samuel B., Jr., to Dravo Corporation. Method of pelletizing glass batch materials. 3,914,364, Cl. 264-117.000.

Enoguchi, Yuji: *See—*
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,914,046.

Enstrom, Robert Victor, to Illinois Tool Works Inc. Fastener driving tool. 3,913,685, Cl. 173-117.000.

Entwistle, Ian D.; Williams, Peter J.; and Devlin, Barry R. J., to Shell Oil Company. Herbicidal 5,6-disubstituted-benzoisoxazole-4,7-diones. 3,914,244, Cl. 260-307.00D.

Envex Corporation: *See—*
Boutacoff, Theodore A., 3,913,286.

EPPCO: *See—*
Coucher, Robert G.; and Taylor, Edward, 3,913,795.

Eriksson, Olle: *See—*
Andersson, Ingmar; and Eriksson, Olle, 3,913,689.

Ernest, Robert P.; Ahrns, Daniel C.; Crowley, Thomas E.; and Ounsted, Edwin J., to Ford Motor Company. Alignment of the major housings in a wankel rotary engine. 3,913,198, Cl. 29-156.40R.

Ernest, Robert P.; and Ahrns, Daniel C., to Ford Motor Company. Pressure lubrication to apex corner seal. 3,913,706, Cl. 184-6.500.

Ernst, Horst M., to SKF Industrial Trading and Development Company B.V. Antifriction bearings. 3,913,993, Cl. 308-196.000.

Ersfeld, Heinrich; Schulte, Klaus; and Boden, Heinrich, to Bayer Aktiengesellschaft. Mixing apparatus. 3,913,892, Cl. 259-4.000.

Erste Deutsche Floatglas GmbH. & Co.: *See—*
Muller, Ernst; and Popovic, Dragan, 3,913,965.

Esau, Robert N.: *See—*
Koehn, Franklin E.; Esau, Robert N.; and Jantz, Le Vern D., 3,913,934.

Esser, Paul; Mayer, Emil; and Rahn, Paul, to Meyer, Roth & Pastor Maschinenfabrik GmbH. Apparatus for bevelling wire blanks. 3,913,374, Cl. 72-404.000.

Ethyl Corporation: *See—*
Jones, John T.; Ludt, William C.; and Kellogg, Hudson W., 3,913,380.

Eugen Vogt: *See—*
Siepmann, Walter, 3,913,887.

Evanega, George R.; Kuhla, Donald E.; and Sarges, Reinhard, to Pfizer Inc. Piperidinesulfonylurea derivatives for lowering blood sugar levels. 3,914,426, Cl. 424-266.000.

Evans, Wayne Wheeler, to RCA Corporation. Controllable reference supply for television tuners. 3,914,696, Cl. 325-422.000.

Every, Peter; and Tribe, Leonard T., to Kelsey-Hayes Company. Skid control system embodying automatic cycling and fail safe device. 3,913,984, Cl. 303-21.00F.

Ewanika, Theodore; and Walker, William, to Bilted Industries Ltd. Barbecue or cooking unit. 3,913,557, Cl. 126-43.000.

Exxon Production Research Company: *See—*
Heilhecker, Joe K.; Wood, Donald B.; and Heintz, Karl O., 3,913,688.
Howard, Willis W.; Maurer, William C.; and Lock, Everett H., 3,914,752.
Todd, William W.; Ilfrey, William T.; and Lloyd, James R., 3,913,668.

F. L. Smidth & Co.: *See—*
Gronlund, Martin; and Gude, Klaus Erik, 3,913,237.

F. Lli Sandretto S.a.s.: *See—*
Brocchi, Mario, 3,914,087.

Fabco, Incorporated: *See—*
Walters, Andrew C.; and Goss, William M., 3,913,438.

Fabricius, John H., to Sprague Electric Company. Positive-temperature-coefficient-resistor package. 3,914,727, Cl. 338-22.00R.

Fabrique Nationale Herstal S.A.: *See—*
Dhondt, Prosper E., 3,913,358.

Fabro, Roberto; and Tolone, Roberto, to Robert Bosch Photokino GmbH. Apparatus for transporting flexible webs in motion picture projectors or the like. 3,913,865, Cl. 242-189.000.

Fackler, Kenneth C.; and Bradford, John O., to M & W Gear Company. Preheater for grain dryer. 3,913,242, Cl. 34-170.000.

Facy, Leopold, to Omnium Technique d'Administration et de Gestion O.T.A. Emulsion layer of coloured indicators for determining spectra of the effects of a fluid on a surface. 3,913,393, Cl. 73-105.000.

Fairchild Camera and Instrument Corporation: *See—*
Pezzolo, Donald E., 3,914,622.
Seeds, Robert B.; and Luce, Robert L., 3,913,211.

Fairchild Industries, Inc.: *See—*
Gruodis, Romualdas K., 3,913,727.
Gruodis, Romualdas K.; Botula, Bernard C.; and Milan-Kamski, Wojslaw J., 3,913,730.

Faircloth, Paul G.; and Apthorp, Carl R., III, to Green Thumb Corporation. Horticulture apparatus. 3,913,758, Cl. 214-38.0BB.

Fargensi, Rudolph: *See—*
Berg, Allen Clark; Fargensi, Rudolph; and Lipani, Anthony Frank, 3,914,181.

Fassle, Fritz: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Faust, Carl Raymond, to Du Pont de Nemours, E. I., and Company. Process for making anhydrous hydrogen fluoride from fluosilicic acid. 3,914,398, Cl. 423-483.000.

Fauth, Donald A.: *See—*
Nelson, Warren J.; and Fauth, Donald A., 3,914,001.

Federal-Mogul Corporation: *See—*
Barefoot, Gerald A.; and Corsi, George L., 3,913,924.
Gordon, Alexander L., 3,913,927.

Federal Pacific Electric Company: *See—*
Hayward, Gary, 3,914,006.

Fehrer, Ernst. Apparatus for disintegrating fibrous material and for delivering disintegrated fibrous material. 3,913,177, Cl. 19-96.000.

Fehrer, Ernst. Method of spinning textile fibers. 3,913,310, Cl. 57-156.000.

Fein, Marvin M.; Field, Nathan D.; and Williams, Earl P., to GAF Corporation. Insoluble, porous complexes made from a crosslinked, nitrogen containing polymer and a phenol. 3,914,187, Cl. 260-2.50B.

Fein, Michael E.: *See—*
Bode, Wolfgang W.; and Fein, Michael E., 3,914,635.

Feldmesser, Howard S., to Westinghouse Electric Corporation. PFN Regulator. 3,914,697, Cl. 328-67.000.

Felthuis, Jacob: *See—*
van Laar, Jacobus; Felthuis, Jacob; Weber, Hendrik Gustaaf Otto; and Olivierse, Hendrik, 3,913,617.

Ferro Corporation: *See—*
Oswitch, Stanley; Golownia, Robert F.; and Kipp, Kevin K., 3,914,200.

Fesperman, Charles D., Jr.: *See—*
Childers, Billy M.; and Fesperman, Charles D., Jr., 3,913,359.

Fessler, Robert Glenn; and Tredinnick, Bruce Charles, to American Cyanamid Company. Intumescent coating compositions containing crystalline melamine pyrophosphate. 3,914,193, Cl. 260-17.00R.

F'Geppert, Erwin, to United States of America, Army. Temperature responsive drive unit. 3,913,713, Cl. 192-70.250.

Fiat-Allis Construction Machinery, Inc.: *See—*
Schaffner, Donald L., 3,913,986.

Fiberwoven Corporation, The: *See—*
Smith, Alexander M., II, 3,913,191.

Fidler, Carl E.: *See—*
Orr, Robert S.; and Fidler, Carl E., 3,913,985.

Field, Michael Frank; and Cavell, Charles James, to Dominion Engineering Works, Limited. Entry and delivery guides for cold rolling mills. 3,913,369, Cl. 72-251.000.

Field, Nathan D.: *See—*
Fein, Marvin M.; Field, Nathan D.; and Williams, Earl P., 3,914,187.

Figari, Jorge Galvez. Floating airport and method of its construction. 3,913,336, Cl. 61-46.500.

Fike Metal Products Corporation: *See—*
Speck, Frank T., 3,913,614.

Fikentscher, Rolf: *See—*
Jorek, Helmut; Fikentscher, Rolf; Kurze, Joachim; and Helfert, Herbert, 3,914,496.

Filature de Saint Andre: *See—*
Lemaire, Paul, 3,913,308.

Fillmen, John H. B. Fishing line strike signaling apparatus. 3,913,255, Cl. 43-17.000.

Finelli, Thomas M.; Lenoe, Edward; and McAllister, Lawrence E., to Avco Corporation. Process for the manufacture of high strength carbon/carbon graphitic composites. 3,914,395, Cl. 423-448.000.

Fineran, Charles A.; and Silwones, Steven S., to Amerace Corporation. Wear reducing coating. 3,914,178, Cl. 252-12.000.
Fink, Lester H. Economic dispatch technique for interconnected power systems. 3,913,829, Cl. 235-151.210.
Finkbeiner, Rudolf. Guide rod for feeding curtain suspenders into position. 3,913,204, Cl. 29-241.000.
Finkel, Joel Roberts; Basch, E. Evert; and Bowerman, Edwin R., to GTE Laboratories, Incorporated. Industrial automation locating and tracking system. 3,914,596, Cl. 250-203.000.
Finlay, Alexander, Jr.; Dyer, Robert E.; and Kessler, William D., to Sangamo Electric Company. Remote meter reading system using electric power lines. 3,914,757, Cl. 340-310.00A.
Finney, David John; Ravenhill, John Richard; and Tait, Malcolm John, to Lever Brothers Company. Ice cream. 3,914,441, Cl. 426-565.000.
Firestone Tire & Rubber Company, The: *See—*
Halasa, Adel Farhan, 3,914,210.
Kang, Jung Wong, 3,914,207.
Fischer, Earl L.: *See—*
Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., 3,913,553.
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, to Bell Telephone Laboratories, Incorporated. Data system multibranch junction circuit having branch line selection. 3,914,743, Cl. 340-147.00R.
Fitzgerald, John H.: *See—*
Green, Herbert; Guarino, Robert A.; and Fitzgerald, John H., 3,914,763.
Flamig, Hans, to J. M. Voith GmbH. Sieve roll for use in paper drying apparatus or the like. 3,913,240, Cl. 34-114.000.
Flaregas Engineering Limited: *See—*
Proctor, Albert Edward, 3,914,093.
Flaum, Stephen S., to S&S Corrugated Paper Machinery Co., Inc. Positioning means for hold-down. 3,913,464, Cl. 93-36.300.
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., to Owens-Corning Fiberglass Corporation. Gloss fibers coated with a size comprising a film-farming binder and an amino acid. 3,914,192, Cl. 260-4.00R.
Flesch, Friedrich; Bappert, Adolf; and Striegel nee Kloss, Marlen, to Upat-Max Langensiepen KG. Adhesive cartridge. 3,913,733, Cl. 206-219.000.
Flexible Steel Lacing Company: *See—*
Pray, Winston C., 3,913,180.
Flexsteel Industries, Inc.: *See—*
Quakenbush, Howard M., 3,913,152.
Flinchbaugh Products, Inc.: *See—*
Lewis, Michael, 3,913,474.
Floren, Carl E., to Mueller Co. Plastic meter box. 3,913,400, Cl. 73-273.000.
Floyd, Samuel B., Jr.: *See—*
Engelleitner, William H.; and Floyd, Samuel B., Jr., 3,914,364.
Fluid Dynamics (Proprietory) Limited: *See—*
Turner, Lawrence Alexander; and Peter, Roger, 3,913,334.
Fluoroware Systems Corporation: *See—*
Wyers, Joseph H., 3,913,749.
FMC Corporation: *See—*
Buck, Erville C., 3,913,472.
Folds, Donald L.: *See—*
Warner, Henry L.; Wallace, Henry C.; and Folds, Donald L., 3,914,731.
Foley, Kevin M.: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 3,914,192.
Fontaine, Louis: *See—*
Szarvasi, Etienne; and Fontaine, Louis, 3,914,379.
Fontana, Fernando, to Fontana Fernando S.p.A. Clasp for metal bracelets and in particular for wrist-watch bracelets or straps. 3,913,182, Cl. 24-71.00J.
Fontana Fernando S.p.A.: *See—*
Fontana, Fernando, 3,913,182.
Forbes, F. Douglas, to Magnavox Company, The. Methods and apparatus for scrambling and unscrambling premium television channels. 3,914,534, Cl. 178-5.100.
Ford Motor Company: *See—*
Augustin, Eugene H.; Johnson, Roger E.; and Rakestraw, Thomas L., 3,913,812.
Boller, Thomas E.; and Guerra, Salvatore, 3,914,180.
Camp, John Walter Aldridge, 3,913,714.
Ernest, Robert P.; Ahrns, Daniel C.; Crowley, Thomas E.; and Ounsted, Edwin J., 3,913,198.
Ernest, Robert P.; and Ahrns, Daniel C., 3,913,706.
Fyie, Vincent L., 3,913,544.
Guerriero, Charles P.; and Hayward, Donald K., 3,913,932.
Guerriero, Charles P.; and Hayward, Donald K., 3,913,941.
Haase, Lawrence H.; and Liimatta, David R., 3,913,545.
Johnson, Roger E.; and Sawai, Joe Y., 3,913,272.
Kennedy, James H.; and Negstad, Robert D., 3,913,696.
Labana, Santokh S.; and Theodore, Ares N., 3,914,333.
Rao, V. Durga Nageswar, 3,913,926.
Talmage, Dennis D.; and Stokes, Paul D., 3,914,619.
Forler, C. Richard; and Heins, Conrad F., to Glass Doctor, Inc., The. Method and apparatus for repairing cracks in plate glass. 3,914,145, Cl. 156-98.000.
Formex Manufacturing, Inc.: *See—*
Dean, Donald E.; and Alesi, John, Jr., 3,914,103.
Dean, Donald E.; and Alesi, John, Jr., 3,914,104.
Forsgren, Lyle M., to Brunswick Corporation. Suspension apparatus for ground engaging drive tracks. 3,913,694, Cl. 180-5.00R.
Forsman, Arnold H. Continuous wave surfing facility. 3,913,332, Cl. 61-1.00R.
Forster, Gerhard; and Keller, Hans, to RCA Corporation. Voltage regulator for deflection circuit. 3,914,653, Cl. 315-389.000.
Fort Worth Pressed Steel Corporation: *See—*
Arrington, Earl J.; Deal, Jerry E.; and Hunsaker, Roger C., 3,914,069.
Foster, Edson P. Felting needle with barb on a single edge and an isosceles blade. 3,913,189, Cl. 28-4.00N.
Foster, Thomas Vincent, to Emhart Corporation. Individual section high speed glassware forming machine. 3,914,120, Cl. 65-229.000.
Foster Wheeler Energy Corporation: *See—*
Skinner, Geoffrey Frederick, 3,913,315.
Foures, Guy. Respirator actuating mechanism. 3,913,458, Cl. 92-13.700.
Fox, Roger Geoffrey; and Cox, Vernon Frederick, to Rolls-Royce (1971) Limited. Gas turbine engine combustion equipment. 3,913,318, Cl. 60-39.660.
Francis, Robert L.: *See—*
Rouse, Paul L.; and Francis, Robert L., 3,913,589.
Franciscan Enterprises, Inc.: *See—*
Cho, Fan Pong, 3,914,753.
Franke, Norman W.: *See—*
Barie, Walter P., Jr.; and Franke, Norman W., 3,914,512.
Franklin, James L.; and Pogson, John T., to Boeing Company, The. External tube artery flexible heat pipe. 3,913,665, Cl. 165-105.000.
Franz Plasser Bahnbaumaschinen-Industriegesellschaft mbH: *See—*
Theurer, Josef; and Oellerer, Friedrich, 3,913,490.
Frazee, Foster Wayne, to International Telephone and Telegraph Corporation. On-hook and off-hook detector for telephone switching systems. 3,914,556, Cl. 179-18.00F.
Frazita, Richard F.: *See—*
Litt, Stuart P.; Zeltser, Melvin J.; Giannini, Richard J.; and Frazita, Richard F., 3,914,765.
Freiborg, Bennie. Asphalt composition hip and ridge cover. 3,913,294, Cl. 52-518.000.
Freiburger, Thomas William, to Deere & Company. Differential structure for preventing leakage of differential lock actuating fluid to the differential housing. 3,913,414, Cl. 74-710.500.
Freitag, Jean: *See—*
Laribe, Armand, 3,914,593.
French, Tom, to Dunlop Holdings Limited. Pneumatic tires. 3,913,654, Cl. 152-330.00L.
Frentzel Development, Inc.: *See—*
Frentzel, Herman C.; and Frentzel, Thomas H., 3,913,532.
Frentzel, Herman C.; and Frentzel, Thomas H., to Frentzel Development, Inc. Rotary engine. 3,913,532, Cl. 123-8.310.
Frentzel, Thomas H.: *See—*
Frentzel, Herman C.; and Frentzel, Thomas H., 3,913,532.
Freshley, Richard C. Anaerobic specimen collecting and transporting device. 3,913,564, Cl. 128-2.00W.
Frey, James A., to Mead Corporation, The. Alternate memory control for dot matrix late news device. 3,913,719, Cl. 197-1.00R.
Frey, Roberto Jose. Method of making sealed tubes. 3,913,207, Cl. 29-413.000.
Frick, Wilhelm Ernst; Weiss, Anton G.; Wenger, Thomas; and Traber, Walter, to Ciba-Geigy Corporation. Phenoxy-substituted ortho-nitroanilines and ortho-phenylenediamines. 3,914,310, Cl. 260-571.000.
Fried, John H.; and Harrison, Ian T., to Syntex Corporation. Naphthyl acetaldehyde derivatives; methods of use thereof; and processes for the preparation thereof. 3,914,293, Cl. 260-512.00C.
Fried, Max. Doorknob security device. 3,913,361, Cl. 70-424.000.
Friedman, Herbert W.; Caristi, Robert F.; and Morton, Richard G., to Avco Everett Research Laboratory, Inc. Flashlamp discharge circuit. 3,914,648, Cl. 315-241.00P.
Friedman, Robert. Apparatus for automatically feeding and removing cylindrical bodies to and from a working head. 3,913,751, Cl. 214-1.0PB.
Friedrich Deckel Aktiengesellschaft: *See—*
Baumer, Michael; and Baumgartner, Ludwig, 3,913,192.
Friese, Karl E., to IMC Magnetics Corporation. Electrically driven fan. 3,914,071, Cl. 417-353.000.
Frigon, Richard J., to Sprague Devices, Inc. Windshield washer nozzle device. 3,913,167, Cl. 15-250.040.
Fritsch, Werner: *See—*
Stache, Ulrich; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, 3,914,213.
Frohberger, Paul-Ernst: *See—*
Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst; and Scheinpflug, Hans, 3,914,427.
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.
Frost, William H.: *See—*
Meylan, Jean-Luc Ch.; Frost, William H.; and Meier, John G., 3,913,667.
Fuchs, Helmut, to Ciba-Geigy Corporation. Layer material for the rapid chromatographic identification of fluid substances, method for the preparation thereof, and use thereof. 3,914,174, Cl. 210-31.00C.
Fuchs, Paul-Wilhelm: *See—*
Dillenburg, Helmut; Honig, Helmut; and Fuchs, Paul-Wilhelm, 3,914,380.

Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, to Sony Corporation. Bath for the electrodeposition of birght tin-cobalt alloy. 3,914,160, Cl. 204-43.00S.

Fuhr, Karl: *See*—
Rudolph, Hans; Heine, Hans-Georg; Fuhr, Karl; and Schnell, Hermann, 3,914,166.

Fuji Telecasting Co., Ltd.: *See*—
Watanabe, Hideo; Seki, Yoshivuki; and Takeuchi, Jikko, 3,914,544.

Fujii, Seiji; Kamata, Masamoto; Ishida, Masayuki; and Kuwamoto, Hiroshi, to Nippon Kokan Kabushiki Kaisha. Method and apparatus for shape control of metal products in continuous rolling mill. 3,913,363, Cl. 72-10.000.

Fujii, Yoshifusa: *See*—
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, 3,914,776.

Fujii, yoshikazu: *See*—
Shima, Takesaburo; Sakamoto, Sukehiko; and Fujii, yoshikazu, 3,914,339.

Fujimoto, Eiji: *See*—
Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, 3,913,384.

Fujimoto, Nichio: *See*—
Yamakami, Kiyoshi; Akazawa, Osamu; Shibata, Yoshiyuki; and Fujimoto, Nichio, 3,914,280.

Fujita, Satoshi: *See*—
Terada, Kimio; Fujita, Satoshi, and Yoshida, Noritoki, 3,914,458.

Fujitsu Limited: *See*—
Murase, Kenji; Ishizaki, Hiroyuki; and Kurahashi, Keizo, 3,914,761.

Fukuda, Masaaki: *See*—
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Fukunaga, Mitsunobu: *See*—
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.

Fukunaga, Motoaki: *See*—
Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, 3,914,579.

Fukushima, Keitaro; Kishimoto, Soichiro; and Nosaka, Yoshinori, to Japan Exlan Company Limited. Process for producing carbon fibers. 3,914,394, Cl. 423-447.000.

Fukushima, Osamu; Sato, Masamichi; and Matsumoto, Seiji, to Rank Xerox, Ltd. Liquid developing apparatus for electrophotography. 3,913,524, Cl. 118-637.000.

Fuller, Lee R.: *See*—
Cable, Stephen J.; Fuller, Lee R.; and Hothem, John H., 3,914,099.

Funck, Herbert. Method for the production of cushioned-sole shoes and last to perform the method. 3,913,160, Cl. 12-142.00R.

Furstlich Hohenzollernsche Huttenverwaltung Laucherthal: *See*—
Keller, Dieter; Kuhn, Rudolf; and Dotzauer, Willi, 3,913,301.

Furukawa Electric Co., Ltd., The: *See*—
Shiina, Naonori; and Hosoda, Kirokuro, 3,914,361.

Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, to Kabushiki Kaisha Meidensha. Water quality determination apparatus. 3,913,384, Cl. 73-53.000.

Fusco, Ralph L. Printing ink pump. 3,914,073, Cl. 417-500.000.

Fusiek, Michael P., to Dana Corporation. Ceramic fiber gasket. 3,914,490, Cl. 428-133.000.

Fustukian, David A. W., to Sherritt Gordon Mines Limited. Method of preparing metal alloy coated composite powders. 3,914,507, Cl. 428-404.000.

Fyie, Vincent L., to Ford Motor Company. Induction air temperature control apparatus for an internal combustion engine. 3,913,544, Cl. 123-122.00D.

G. Siempelkamp & Co.: *See*—
Kober, Harald, 3,914,079.

Gabaglio, Mario: *See*—
Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., 3,913,208.

GAF Corporation: *See*—
Bennett, Frank P.; and Hall, Walter J., 3,914,039.
Fein, Marvin M.; Field, Nathan D.; and Williams, Earl P., 3,914,187.
Valan, Kent John, 3,914,403.

Gaillard, Anne: *See*—
Guichard, Jean-Claude; Gaillard, Anne; and Blainie, Jean Marie Michel Paul, 3,913,631.

Gaines, John W.: *See*—
Packard, Norman M.; and Gaines, John W., 3,913,199.

Galis, Alex J. Apparatus for positioning cable-type roof supports in a mine roof. 3,913,338, Cl. 61-63.000.

Gall, Martin, to Upjohn Company, The. 4(2-Phenyl-o-totyl)-3,5-disubstituted-4h-1,2,4,-triazoles. 3,914,245, Cl. 260-308.00R.

Galletti, Cesare, to Innocenti Santeustacchio S.p.A. Winding device for sheet metal strip. 3,913,367, Cl. 72-148.000.

Gappa, Gunther: *See*—
Juntgen, Harald; Knoblauch, Karl; Gappa, Gunther; and Schwarte, Jurgen, 3,913,253.

Garcia Corporation, The: *See*—
Smith, Melvin William, 3,913,912.

Garcia, Onofre S. Wing to swim or to row. 3,913,516, Cl. 115-31.000.

Gardiner, William P. Centerless brushless DC motor. 3,914,629, Cl. 310-46.000.

Gardini, Mario; and Tabaroni, Roberto, to Azionaria Costruzioni Macchine Automatiche A.C.M.A. S.p.A. Apparatus for forming groups of flat objects. 3,913,203, Cl. 29-211.00R.

Gardner, Carl J., to United States of America, Army. Electronic counting fuze. 3,913,484, Cl. 102-70.20R.

Gardner-Denver Company: *See*—
Jameson, James J., 3,913,411.

Garmon, Lee F., Jr.: *See*—
Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., 3,913,553.

Garnish, Edward William; and Haskins, Clifford George, to Ciba-Geigy AG. Reaction products of polyepoxides, mercaptoalkanoic acid esters and amines. 3,914,288, Cl. 260-481.00R.

Garside, John Duncan: *See*—
Priestley, Terence Patrick; and Garside, John Duncan, 3,913,448.

Gasc, Jean-Claude; and Torelli, Vesperto, to Roussel Uclaf. Novel antiandrogenic compounds. 3,914,420, Cl. 424-243.000.

Gaske, Joseph E., to DeSoto, Inc. Radiation curable non-gelled michael addition reaction products. 3,914,165, Cl. 204-159.150.

Gaskill, James R., Jr.; and Weill, Lawrence R., to Hughes Aircraft Company. Four-by-four bit multiplier module having three stages of logic cells. 3,914,589, Cl. 235-164.000.

Gasson, Edward James; Marrian, Stanley Frederic; and Krosnar, Thomas Charles, to BP Chemicals International Limited. Process for preparing aerylonitrile using as catalyst an oxide composition of antimony, tin, titanium and copper or iron. 3,914,278, Cl. 260-465.300.

Gates, Jack R. Energy conservation chamber. 3,913,663, Cl. 165-102.000.

Gavin, David F.; and Tobin, John H., to Olin Corporation. Method for preparing phenol compounds using mixed acid system. 3,914,325, Cl. 260-623.00R.

Gavrilova, Eva: *See*—
Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, 3,914,341.

Gawrilow, Ilija, to SCM Corporation. Process for preparing bakery products. 3,914,453, Cl. 426-553.000.

Gazda, Chester T.; and Lalikos, James M., to Titeflex. Poly-polymer plastic material and device made therefrom. 3,913,625, Cl. 138-140.000.

Gebr. Giulini GmbH: *See*—
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Gebruder Junghans GmbH: *See*—
Assmus, Friedrich, 3,913,313.
Wolber, Robert; and King, Josef, 3,913,311.

Gebrueder Bellmer KG Maschinenfabrik: *See*—
Keck, Jurgen, 3,913,465.

Gee, James E.; Sieving, Alfred W.; and Ping, David T., to Caterpillar Tractor Co. Conversion arrangement for a dump truck. 3,913,948, Cl. 280-415.00R.

Gehweiler, William Frederick, to RCA Corporation. Complementary field-effect transistor amplifier. 3,914,702, Cl. 330-13.000.

Geiger, Walter: *See*—
Boshagen, Horst; Geiger, Walter; and Medenwald, Hans, 3,914,242.

Gejyo, Tetsuo: *See*—
Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, 3,914,390.

Gelatt Investments, Inc.: *See*—
Peters, Arnis E., 3,914,037.

Gem Industries, Inc.: *See*—
Heininger, Richard T., 3,914,062.

Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, to Abbott Laboratories. [Des—Gly] 10 -Gn—RH nonapeptide amide analogs in position 6 having ovulation-inducing activity. 3,914,412, Cl. 424-177.000.

General Battery Corporation: *See*—
Carson, Charles, 3,914,134.

General Electric Company: *See*—
Alvarez, Robert J., 3,913,350.
Bellamy, Winthrop D., 3,914,437.
Crouch, Donald W.; Kurtz, Donald R.; and Sofianek, Joseph C., 3,914,568.
Hale, Thomas Eugene, 3,914,473.
Hay, Allan S., 3,914,266.
Hesler, Joseph P.; and Korzekwa, Samuel M., 3,914,680.
Irwin, John M.; and Powell, Noble R., 3,914,590.
Kashnow, Richard A., 3,914,022.
Kindig, Alan L., 3,913,373.
Konrad, Charles Edward, 3,914,675.
Magester, Earl H., 3,913,348.
Melanson, Roland J., 3,914,657.
Modic, Frank J.; and Dujack, George M., 3,914,369.
Passarelli, Henry Andrew, Jr., 3,914,621.
Priluck, David Manuel, 3,913,329.
Skreiner, Klaus M., 3,913,459.
Sterling, Vaughn C., 3,914,143.
Tillson, Robert S., 3,914,005.

General Foods Corporation: *See*—
Witzig, Ralph P., 3,914,440.

General Mills, Inc.: *See*—
Norsby, Norrain E.; and Schultz, James R., 3,914,456.
Valentas, Kenneth J.; and Lindl, Willibald M., 3,914,455.

General Motors Corporation: *See—*
Davis, Leonard C., 3,913,662.
Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., 3,914,050.
Downing, Noel L., 3,914,066.
Green, Raymond J., 3,913,535.
McIntosh, Duane E., 3,914,586.
Parker, William J., 3,913,703.
Shellhause, Ronald L., 3,913,327.

General Signal Corporation: *See—*
Auer, John H., Jr.; and Polsky, Lawrence M., 3,913,491.
Larime, Carl M., 3,913,958.

General Tire & Rubber Company, The: *See—*
Benton, Richard E., 3,914,186.
Dekking, Henri G. G., 3,914,340.
Sommer, John G., Jr., 3,913,209.

Gentaro Kumagai: *See—*
Kumagai, Gentaro, 3,913,270.

Georgia-Pacific Corporation: *See—*
Horowitz, Frederic, 3,914,155.

Geotel, Inc.: *See—*
Muehlberger, Erich, 3,914,573.

Gerard, William A., to Varian Associates. Rotary tuner for circular electric mode crossed field tube. 3,914,644, Cl. 315-39.610.

Gerke, Burton Elwood, Jr.: *See—*
Speer, Howard David; and Gerke, Burton Elwood, Jr., 3,913,437.

Gerst, Joseph J. Spot weld remover. 3,913,423, Cl. 81-3.00R.

Gertsch AG: *See—*
Kratky, Helmut, 3,913,931.

Giannini, Richard J.: *See—*
Litt, Stuart P.; Zeltser, Melvin J.; Giannini, Richard J.; and Frazita, Richard F., 3,914,765.

Giddings, Brandford E.; and Rosen, Irving, to Standard Oil Company, The. Polyblends comprising S-A copolymer and graft copolymer of S-A-acrylate onto a diene rubber. 3,914,337, Cl. 260-876.00R.

Gidick, Ward F., to Koppers Company, Inc. Reversing clutch. 3,914,159, Cl. 202-270.000.

Gigoux, Claude, to Thomson-CSF. Method of manufacturing a double-sided circuit. 3,913,223, Cl. 29-625.000.

Gilson, Anton, to Sybron Corporation. Pulse duration process controller. 3,914,581, Cl. 235-92.0CT.

Ginocchio, James A., to Personal Products Company. Adhesively attached absorbent product. 3,913,580, Cl. 128-290.00W.

Girling Limited: *See—*
Margetts, Hugh Grenville, 3,913,710.
Newstead, Charles; and Wright, Andrew Charles Walden, 3,913,708.

Giuffre, Luigi: *See—*
Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, 3,914,313.

Giusto, Pietro Porzio, to CSELT - Centro Studi e Laboratori Telecomunicazioni SpA. Data transmission with dual PSK modulation. 3,914,695, Cl. 325-145.000.

Givaudan Corporation: *See—*
Shaffer, Gary W.; Kitchens, Garry C.; and Kaiser, Kent, 3,914,314.

GKN Group Services Limited: *See—*
Lloyd, Brian Edwin; and Marsh, Barry John, 3,914,370.

Glanz, Kenneth D.; and McQuain, David B., to NCR Corporation. Thermal sensitive transparency. 3,914,510, Cl. 428-411.000.

Glass Doctor, Inc., The: *See—*
Forler, C. Richard; and Heins, Conrad F., 3,914,145.

Glatt, Werner; and Siemer, Harm, to Glatt, Werner. Granulator. 3,913,847, Cl. 241-46.040.

Globe Tool and Engineering Company, The: *See—*
Miller, Jerry E., 3,913,220.

Glory Kogyo Kabushiki Kaisha: *See—*
Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, 3,914,579.

Glosek, John J.: *See—*
Dembiak, Matthew R.; and Glosek, John J., 3,914,356.

Glutting, Howard: *See—*
Glutting, Roy H., Jr.; and Glutting, Howard, 3,913,598.

Glutting, Roy H., Jr.; and Glutting, Howard. Hunter's blind and shelter. 3,913,598, Cl. 135-4.00R.

Gobler, Harry W.; and Grotheer, Robert, to Ecodyne Corporation. Weld plate assembly positioning apparatus. 3,913,881, Cl. 249-83.000.

Godfrey, John Carl, to Bristol-Myers Company. Method for preparing sucrose composition containing chromium III salt. 3,914,410, Cl. 424-131.000.

Goehner, Ronald H.: *See—*
Enck, Richard S., Jr.; Goehner, Ronald H.; and Guy, Gordon Noel, 3,914,599.

Goessling, John G.; and Lage, David P., to Quick Point Pencil Co., Inc. Ring-type holder. 3,913,362, Cl. 70-459.000.

Goettl, William H. Air conditioner. 3,913,345, Cl. 62-183.000.

Gogins, Laird B., to Power-Matic Corporation. Variable speed transmission. 3,913,698, Cl. 180-66.00R.

Goishihara, Tsutomu, to Yamada Dobby Co., Ltd. Heald frame leveling apparatus in a dobby machine. 3,913,627, Cl. 139-75.000.

Golan, Kenneth Frank, to Caterpillar Tractor Co. Downshift inhibitor system for automatic transmission control. 3,913,416, Cl. 74-752.00C.

Goldberg, Morris: *See—*
Behnk, Donald J., 3,913,165.

Goldman, Leon: *See—*
Marsico, Joseph William, Jr.; and Goldman, Leon, 3,914,264.

Goldman, Samuel C.: *See—*
Martone, Ronald J.; Goldman, Samuel C.; and Dewhirst, Roy, 3,914,614.

Goldstein, Norman P., to Westinghouse Electric Corporation. Plutonium monitor. 3,914,602, Cl. 250-253.000.

Golownia, Robert F.: *See—*
Oswitch, Stanley; Golownia, Robert F.; and Kipp, Kevin K., 3,914,200.

Gomco Surgical Manufacturing Corporation: *See—*
Baumgarten, Carl B., 3,913,586.

Goodbar, Isaac, to Edison Price, Inc. Positive action magnetic latching relay. 3,914,723, Cl. 335-79.000.

Goodridge, William C., to Electrostatic Equipment Corporation. Electrostatic coating method. 3,914,461, Cl. 427-33.000.

Gordon, Alexander L., to Federal-Mogul Corporation. Sealing boundary gasket for sealing between metal members that are held together by bolts. 3,913,927, Cl. 277-166.000.

Gordon, Ronnie D., to Continental Oil Company. Preparation of N-iodocompounds. 3,914,252, Cl. 260-326.5FM.

Gordon, Ronnie D., to Continental Oil Company. Preparation of ethers. 3,914,320, Cl. 260-611.00A.

Gorecki, Marian; and Patchornik, Abraham, to Yeda Research and Development Co., Ltd. Reducing polymer. 3,914,205, Cl. 260-79.000.

Gorog, Istvan: *See—*
Carlson, Curtis Raymond; Gorog, Istvan; and Heyman, Philip Michael, 3,914,711.

Gorrafa, Adly Abdel-Moniem, to Du Pont de Nemours, E. I., and Company. Polyester filaments for fur-like fabrics. 3,914,488, Cl. 428-397.000.

Gosnell, Russell J.: *See—*
Atanasoff, Irving M.; Gosnell, Russell J.; and Smith, Jimmie L., 3,913,849.

Goss, William M.: *See—*
Walters, Andrew C.; and Goss, William M., 3,913,438.

Gould, Francis E.: *See—*
Shepherd, Thomas H.; and Gould, Francis E., 3,914,405.

Graber, Adolf; and Tischer, Kurt, to Carl Freudenberg, Firma. Iron-in stiffening insert. 3,914,493, Cl. 428-195.000.

Graco Inc.: *See—*
Petrovic, John E., 3,913,844.

Graham, Leonard P.: *See—*
Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., 3,914,495.

Granchelli, Felix E.: *See—*
Pars, Harry G.; Granchelli, Felix E.; and Razdan, Raj K., 3,914,237.

Grandy, Andrew J. Ammunition and weapon systems. 3,913,445, Cl. 89-35.00R.

Grandy, Andrew J. Ammunition and weapon systems. 3,913,446, Cl. 89-35.00A.

Grant, Marshall D. Spray/jet washing device. 3,913,837, Cl. 239-198.000.

Granzer, Ernold: *See—*
Lerch, Ulrich; and Granzer, Ernold, 3,914,236.

Graphic Systems, Inc.: *See—*
Griffith, Louis E.; and Ebner, Peter R., 3,914,774.

Grassi, Arturo. Pipe clamp. 3,913,188, Cl. 24-276.000.

Grasso, Charles Paul: *See—*
Cross, Barrington; and Grasso, Charles Paul, 3,914,285.

Graves, Robert E., to Shepard Chemical Industries, Inc. Dry particulate flavor composition, method of making same and use thereof. 3,914,439, Cl. 426-78.000.

Gray, Wallie P., to Rohr Plessey Corporation. Article carry tray for carriages of a commodity sorting system. 3,913,726, Cl. 198-154.000.

Grayson, Robert E. Fingertip nut and bolt holding tool. 3,913,646, Cl. 145-46.000.

Greco, Edgar Joseph: *See—*
Wylot, James Matthew; and Greco, Edgar Joseph, 3,914,129.

Green, Hal, to Empire Automotive, Inc. Detachable sun roof panel for automobiles. 3,913,971, Cl. 296-137.00B.

Green, Herbert; Guarino, Robert A.; and Fitzgerald, John H., to United Aircraft Corporation. Hybrid filter employing digital techniques and analog components and amti radar employing same. 3,914,763, Cl. 343-7.700.

Green, Paul Clifford; and Moore, Keith Oswin, to Newage Engineers Limited. Radial-piston rotary hydrostatic machines. 3,913,455, Cl. 91-492.000.

Green, Raymond J., to General Motors Corporation. Internal combustion rotary engine oxidizing fluid injection arrangement. 3,913,535, Cl. 123-8.450.

Green Thumb Corporation: *See—*
Faircloth, Paul G.; and Apthorp, Carl R., III, 3,913,758.

Greene, Clarence Kirk. Vehicle having a power take-off and a hydraulic motor, and method of driving same. 3,913,697, Cl. 180-14.00A.

Greene, Clifford E., to Superior Continental Corporation. Self-adjusting repeater for voice frequency telephone transmission systems. 3,914,560, Cl. 179-170.00R.

Greenfield, Stanley E.: *See—*
Seidel, Michael C.; Von Meyer, William C.; and Greenfield, Stanley E., 3,914,223.

Greenwood, Marvin H.; and Powell, Walter W., to Anderson, Greenwood & Co. Valve. 3,913,885, Cl. 251-63.000.

Gregory, M. Duane: *See—*
Krehbiel, Delmar D.; Gregory, M. Duane; Clark, Charles R.; and Kennedy, Carl D., 3,913,674.

Grenzendorfer, Dieter; and Hentschel, Hans-Dieter, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Method and device for controlling a uniform fleece supply during tufting. 3,913,504, Cl. 112-79.00R.

Greth, Erich, to Lonza, Ltd. Process for the production of succinylosuccinic diester. 3,914,281, Cl. 260-468.00K.

Grewe, Ferdinand: *See—*
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Griffith, Louis E.; and Ebner, Peter R., to Graphic Systems, Inc. Photo machine with rod and rack guided carriage. 3,914,774, Cl. 354-5.000.

Grisel, Yvan Victor. Cosmetic case. 3,913,595, Cl. 132-88.700.

Gronlund, Martin; and Gude, Klaus Erik, to Aktieselskabet Niro Atomizer; and F. L. Smidth & Co. Method of and a plant of producing cement clinker from cement slurry. 3,913,237, Cl. 34-10.000.

Grooss, Frank August; and Wagner, Rudolf, to Caterpillar Tractor Co. Large capacity bucket with high-dumping capability. 3,913,768, Cl. 214-774.000.

Grossi, Brian John, to Hewlett-Packard Company. In-line reflective lead-pair for light-emitting diodes. 3,914,786, Cl. 357-68.000.

Grossi, Oscar, to Tematex S.p.A. Apparatus for the draft and breaking of synthetic textile fibres. 3,913,176, Cl. 19-.350.

Grote, Hans-Gunther: *See—*
Berner, Klaus; Kugler, Jorg; and Grote, Hans-Gunther, 3,913,388.

Grotheer, Robert: *See—*
Gobler, Harry W.; and Grotheer, Robert, 3,913,881.

Groves, Frank W., to Twin Disc, Incorporated. Modulatable friction clutch controlled by a centrifugal force and angular acceleration sensitive valve. 3,913,715, Cl. 192-103.0FA.

Gruffax, Max: *See—*
Ducloux, Maurice; and Gruffax, Max, 3,914,505.

Grumman Aerospace Corporation: *See—*
Roukis, John G.; Kosson, Robert L.; and Westell, John R., 3,913,664.

Grumman Allied Industries Inc.: *See—*
Burg, Stanley P.; and Hentschel, William J., 3,913,661.

Gruodis, Romualdas K., to Fairchild Industries, Inc. Take-up cleat. 3,913,727, Cl. 198-199.000.

Gruodis, Romualdas K.; Botula, Bernard C.; and Milan-Kamski, Wojslaw J., to Fairchild Industries, Inc. Article transferring apparatus. 3,913,730, Cl. 198-205.000.

GTE Laboratories, Incorporated: *See—*
Finkel, Joel Roberts; Basch, E. Evert; and Bowerman, Edwin R., 3,914,596.

GTE Sylvania Incorporated: *See—*
Collins, Floyd K.; and Miller, John J., 3,914,638.

Guardian Electric Manufacturing Co.: *See—*
Johnson, Lowell A., 3,914,663.

Guarino, Robert A.: *See—*
Green, Herbert; Guarino, Robert A.; and Fitzgerald, John H., 3,914,763.

Gude, Klaus Erik: *See—*
Gronlund, Martin; and Gude, Klaus Erik, 3,913,237.

Guerra, Salvatore: *See—*
Boller, Thomas E.; and Guerra, Salvatore, 3,914,180.

Guerrieri, Salvatore A., to University of Delaware. Bubble cap tray. 3,914,352, Cl. 261-114.0TC.

Guerriero, Charles P.; and Hayward, Donald K., to Ford Motor Company. Wheel suspension for motor vehicle. 3,913,932, Cl. 280-124.00A.

Guerriero, Charles P.; and Hayward, Donald K., to Ford Motor Company. Independent rear suspension for motor vehicles. 3,913,941, Cl. 280-124.00A.

Gueyne, Charles Henri Jean; and Duffaut nee Paumont, Marie Irene, to Societe Anonyme Exsymol. Certain monomethyl trisilanol mannuronate complexes for treating cellulitis. 3,914,416, Cl. 424-184.000.

Guichard, Jean-Claude; Gaillard, Anne; and Blainie, Jean Marie Michel Paul, to I.E.R.A.M. (Institut Europeen de Recherches et d'Applications Mediales). Aerosol device. 3,913,631, Cl. 141-3.000.

Guillaume, Leon. Reliable safety alarm device for automotive vehicle with engine time delay stop and starter override. 3,914,735, Cl. 340-52.00F.

Gulf Research & Development Company: *See—*
Barie, Walter P., Jr.; and Franke, Norman W., 3,914,512.
Doyle, William C., Jr., 3,914,121.

Gulf & Western Manufacturing Company: *See—*
Nelsen, Roger Jacob; and Johnson, Earl Willard, 3,913,366.

Gullett, James Thomas, to Dresser Industries, Inc. Production of montmorillonite material having good environmental and ecological properties. 3,914,384, Cl. 423-328.000.

Gunderman, Roland E.; and Newman, Ritchey O., Jr., to Dow Chemical Company, The. Expansion of expandable synthetic resinous microspheres. 3,914,360, Cl. 264-51.000.

Gunderson, Gary N.: *See—*
West, John C.; and Gunderson, Gary N., 3,914,726.

Gurries, Raymond A. Mounting arrangement for sidewalk building equipment or the like. 3,914,064, Cl. 404-84.000.

Guskea, Lee, to Wheeling-Pittsburgh Steel Corporation. Pipe protective covering. 3,914,100, Cl. 432-234.000.

Gutehoffnungshutte Sterkarade Aktiengesellschaft: *See—*
Wolters, Gunter, 3,913,898.

Gutnick, Morton. Intrauterine contraceptive devices with plural parallel leg segments. 3,913,573, Cl. 128-130.000.

Gutzwiller, Juerg Albert Walter; and Uskokovic, Milan Radoje, to Hoffmann-La Roche Inc. Processes and intermediates for quinine, quinidine, isomers and derivatives thereof. 3,914,235, Cl. 260-288.0CE.

Guy F. Atkinson Company: *See—*
Sale, Dwight B.; and Koelzer, Terry R., 3,913,419.

Guy, Gordon Noel: *See—*
Enck, Richard S., Jr.; Goehner, Ronald H.; and Guy, Gordon Noel, 3,914,599.

Guyer, Reynolds. Hinged panels. 3,913,656, Cl. 160-135.000.

Guzman, Adolfo M.; and Lawes, Harlan D., to International Business Machines Corporation. Capstan motor having a ceramic output shaft and an adhesively attached capstan. 3,914,631, Cl. 310-75.000.

Gyongyosi, Laszlo; and Whetstone, Everett A., to Ingersoll-Rand Company. Pipe handling system. 3,913,687, Cl. 175-85.000.

Gyory, Emeric J., to Borg-Warner Corporation. Positive lubrication hydrodynamic lip seal. 3,913,925, Cl. 277-75.000.

Haacke, Gottfried C., to American Cyanamid Company. Lanthanum oxidation catalyst and method for utilizing the same. 3,914,389, Cl. 423-263.000.

Haase, Lawrence H.; and Liimatta, David R., to Ford Motor Company. Evaporative emission system. 3,913,545, Cl. 123-136.000.

Hackbarth, William E.: *See—*
Lohse, Lawrence L.; and Hackbarth, William E., 3,913,517.

Hadden, David R., Jr., to United States of America, Army. MNOS Memory matrix with shift register input and output. 3,914,750, Cl. 340-173.00R.

Haddock, Ernest; and Hopwood, William J., to Shell Oil Company. Phenyl ketoxime derivatives. 3,914,300, Cl. 260-553.00A.

Hadeishi, Tetsuo, to United States of America, Energy Research and Development Administration. Zeeman effect absorption spectrometer. 3,914,054, Cl. 356-51.000.

Hadley, Vivian L.: *See—*
Richards, George, deceased; Hadley, Vivian L.; and Petrovich, Arlene I., 3,913,172.

Haede, Werner: *See—*
Stache, Ulrich; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, 3,914,213.

Haeger, Bruce Edwin; and Nash, Robert Arnold, to American Cyanamid Company. Two compartment one unit consecutively injectable liquid vitamin package. 3,914,419, Cl. 424-237.000.

Haerr, Raymond H.: *See—*
Walchle, David L.; and Haerr, Raymond H., 3,913,584.

Haerter, Manfred: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Haffner, Donald G.: *See—*
Kaercher, William C., Jr.; Haffner, Donald G.; and Saiia, Anthony J., 3,913,682.

Hager, Louis Alphonso. Motor vehicle alarm system. 3,914,738, Cl. 340-63.000.

Hahn, Robert S.; and Lindsay, Richard P., to Cincinnati Milacron-Heald Corporation. Grinding machine. 3,913,277, Cl. 51-165.770.

Haines, Ralph W., to Rockwell International Corporation. Calculator having a memory preset key. 3,914,587, Cl. 235-156.000.

Haines, Richard M.: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 3,914,192.

Halasa, Adel Farhan, to Firestone Tire & Rubber Company, The. Process for polymerizing butadiene having a high proportion of syndiotactic 1,2-microstructure. 3,914,210, Cl. 260-94.300.

Hale, Gordon B.; and Wlezien, Richard A., to Outboard Marine Corporation. Snowmobile drive suspension system. 3,913,693, Cl. 180-5.00R.

Hale, Thomas Eugene, to General Electric Company. Method of making a coated cemented carbide product. 3,914,473, Cl. 427-255.000.

Hall, Frank Kenneth, to O'Dell Manufacturing, Inc. Aquarium cover. 3,913,526, Cl. 119-5.000.

Hall, Howard T., to Megadiamond Corporation. Polycrystalline diamond composites. 3,913,280, Cl. 51-307.000.

Hall, Lee Z.; and Rowader, Richard B., to Palmer-Shile Company. Cantilever rack. 3,913,498, Cl. 108-111.000.

Hall, Marshall John, to Patent Development Pty. Limited. Roof guttering. 3,913,284, Cl. 52-11.000.

Hall, Patrick H., to United States of America, Navy. Low drag flameholder. 3,913,319, Cl. 60-39.72R.

Hall, Walter J.: *See—*
Bennett, Frank P.; and Hall, Walter J., 3,914,039.

Hall, Wilbur S.; and Steinbrecher, Lester, to Amchem Products, Inc. Process and composition for coating metals. 3,914,519, Cl. 428-457.000.

Halliburton Company: *See—*
Cox, Bruce M., 3,913,600.
Crummett, Donald L., 3,913,747.
Manson, Charles D., Jr., 3,913,686.
Sutton, Gary D., 3,914,132.

Hamaker, Ralph A.; and Roth, Charles T., to Xerox Corporation. Common path image exploring apparatus. 3,914,546, Cl. 178-7.600.

Hambro Structural Systems Ltd.: *See—*
Butts, Ernest O., 3,913,296.

Hamilton, Clark B.: *See—*
Moody, Harold W., Jr.; and Hamilton, Clark B., 3,913,346.

Hamma, Karlmann: *See*—
Holdenried, Willy; and Hamma, Karlmann, 3,913,695.

Hammann, Ingeborg: *See*—
Lorenz, Walter; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,914,243.

Hammer, Walter; and Vittoz, Eric Andre, to Centre Electronique Horloger, S.A. Frequency adjustment of timekeepers. 3,914,706, Cl. 331-1.00A.

Han, Swan Bing, to Northern Electric Company Limited. Error detector for pseudo-random sequence of digits. 3,914,740, Cl. 340-146.10E.

Hanan, Abraham. Jewelry setting lock-attaching structure. 3,913,184, Cl. 24-230.0AT.

Hanegan, Herbert M.: *See*—
Chia, Enrique; Hanegan, Herbert M.; and Keith, Paul S., 3,914,009.

Hanff, Michel; Lions, Noel; and Peronnet, Jean, to Commissariat a l'Energie Atomique. Device for acoustic detection in a nuclear reactor. 3,913,407, Cl. 73-552.000.

Hankins, Frederick E., to Lockheed Electronics Company, Inc. Cross coupled reels system. 3,913,866, Cl. 242-191.000.

Hansen, Ernest Paul: *See*—
Holt, Lemmie C.; and Hansen, Ernest Paul, 3,914,438.

Hanslik, Wilhelm, to Krauss-Maffei AG. Single-thread feed screw for extruders and the like. 3,913,897, Cl. 259-191.000.

Hanson, David E.; and Landers, Harry M. Piston-actuated fluid discharge device. 3,913,604, Cl. 137-68.000.

Hanson, John R., to Tiona-Betts, Inc. Pressure relief and check valve combination. 3,913,601, Cl. 137-39.000.

Hara, Kotaro: *See*—
Takeda, Shinichi; Harada, Tomio; Namie, Koshi; and Hara, Kotaro, 3,914,287.

Hara, Kouichi, to Hitachi, Ltd. X-ray spectroscope. 3,914,605, Cl. 250-276.000.

Hara, Satoshi; Akino, Morio; and Nakagawa, Keizo, to Tokyo Shibaura Electric Co., Ltd. Endless tape transporting device. 3,913,856, Cl. 242-55.19A.

Harada, Tomio: *See*—
Takeda, Shinichi; Harada, Tomio; Namie, Koshi; and Hara, Kotaro, 3,914,287.

Harada, Yoshiro; and Crandall, William B., to United States of America, Air Force. Method for converting crysotile asbestos. 3,914,184, Cl. 252-457.000.

Hardebeck, Klaus: *See*—
Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, 3,914,219.

Hargreaves, Roger Geoffrey: *See*—
Hoye, Peter Albert Theodore; and Hargreaves, Roger Geoffrey, 3,914,431.

Harkness, Richard Ernest, to Combustion Engineering, Inc. Method of making metal reinforced plastic screen. 3,914,368, Cl. 264-219.000.

Harrington, Colin John: *See*—
Ker, Robert Alan Cameron; and Harrington, Colin John, 3,914,182.

Harrington, Thomas L.: *See*—
Condon, John B.; and Harrington, Thomas L., 3,914,468.

Harris Dynamics: *See*—
Harris, Trevor L., 3,913,947.

Harris, Edward M.: *See*—
Parker, Edward H.; Harris, Edward M.; and Meador, Jim D., 3,914,261.

Harris, Stephen E. Two-photon pumped frequency converter and method. 3,914,618, Cl. 307-88.300.

Harris, Trevor L., to Harris Dynamics. Vehicle with variable speed transmission. 3,913,947, Cl. 280-236.000.

Harrison, Ian T.: *See*—
Fried, John H.; and Harrison, Ian T., 3,914,293.

Harrison, John, to Spra-Con Company, The. Conveyor loading system. 3,913,725, Cl. 198-23.000.

Harrower, Harold W. Recording device. 3,914,773, Cl. 346-121.000.

Hart, John E.; Penn, William H., Jr.; and Tuss, John J., to Bendix Corporation, The. Drive coupling. 3,913,412, Cl. 74-424.80R.

Hartmann, Rainer: *See*—
Kunz, Otto; Hartmann, Rainer; and Nicolay, Johann, 3,914,175.

Hashimoto, Hiroshi; and Mogami, Akinori, to Nihon Denshi Kabushiki Kaisha. Electron detector. 3,914,606, Cl. 250-305.000.

Hashimoto, Takemi, to Ricoh Co., Ltd. Automatic reception system for facsimile receiver. 3,914,539, Cl. 178-6.000.

Haskell, Vernon Charles, to Du Pont de Nemours, E. I., and Company. Barrier coated cellulosic substrates. 3,914,518, Cl. 428-451.000.

Haskins, Clifford George: *See*—
Garnish, Edward William; and Haskins, Clifford George, 3,914,288.

Hauf, Robert C.: *See*—
Adams, Kenneth D.; Hauf, Robert C.; and Ostapczuk, Edward W., 3,913,506.

Hauni-Werke Korber & Co. KG: *See*—
Heitmann, Uwe, 3,913,381.

Hausler, Rudolf H., to Universal Oil Products Company. Apparatus for measuring fouling on metal surfaces. 3,913,378, Cl. 73-15.00R.

Hawke, Ethel M. Splatter shield for mixing bowls and the like. 3,913,896, Cl. 259-125.000.

Hawker Siddeley Dynamics Limited: *See*—
Minett, Herbert Hargrave Basil; and Stockwell, Gordon Horsford, 3,913,833.

Hawkins, Curtis Owen, to Du Pont de Nemours, E. I., and Company. Method for installing a capillary insert in a passage through a spinneret. 3,913,421, Cl. 76-107.00S.

Hawley, Jack S., to Pneumeric Corporation. Coupled pneumatic cylinder arrangement. 3,913,457, Cl. 92-13.300.

Hay, Allan S., to General Electric Company. Copper complex. 3,914,266, Cl. 260-438.100.

Hayashi, Hisao: *See*—
Matsushita, Takeshi; Horinaga, Hiroshi; Ohtsu, Takaji; and Hayashi, Hisao, 3,914,781.

Hayashi, Ikuya; Uno, Keiichi; and Matsuoka, Mikio, to Toyo Boseki Kabushiki Kaisha. Heat-adhesive laminated film. 3,914,502, Cl. 428-336.000.

Hayashi, Mikio, to Hayashi Seiko Kabushiki Kaisha. Antipollution apparatus for motor vehicle engines. 3,913,540, Cl. 123-117.00A.

Hayashi Seiko Kabushiki Kaisha: *See*—
Hayashi, Mikio, 3,913,540.

Hayes Albion Corporation: *See*—
O'Malley, Arthur S., 3,913,863.

Haynes, James N., to Hercules Incorporated. Azido formates. 3,914,262, Cl. 260-349.000.

Hayward, Donald K.: *See*—
Guerriero, Charles P.; and Hayward, Donald K., 3,913,932.
Guerriero, Charles P.; and Hayward, Donald K., 3,913,941.

Hayward, Gary, to Federal Pacific Electric Company. Meter socket. 3,914,006, Cl. 339-198.00M.

Hazeltine Corporation: *See*—
Litt, Stuart P.; Zeltser, Melvin J.; Giannini, Richard J.; and Frazita, Richard F., 3,914,765.

Healthways: *See*—
Pitcher, Kenneth R., deceased, 3,913,554.

Heaps, Harry D., Jr., to Connelly Containers, Inc. Two component double thickness shipping containers. 3,913,822, Cl. 229-23.00R.

Heckl, Herwig, to Siemens Aktiengesellschaft. Process for the production of a semiconductor component. 3,913,215, Cl. 29-578.000.

Hedwall, Phyllis Roberta: *See*—
Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, 3,914,239.

Hehl, Karl. Machine base for injection molding machines. 3,914,082, Cl. 425-192.000.

Heien, Sigurd. Offshore terminal. 3,913,335, Cl. 61-46.500.

Heilhecker, Joe K.; Wood, Donald B.; and Heintz, Karl O., to Exxon Production Research Company. Apparatus for mounting electric conductor in a drill string. 3,913,688, Cl. 175-320.000.

Heimlicher, Paul; Rohrer, Jean; and Scharer, Willy, to Maschinenfabrik Wifag. Device for controlling the tension in a web of material being unwound from a roll. 3,913,855, Cl. 242-75.430.

Heine, Hans-Georg: *See*—
Rudolph, Hans; Heine, Hans-Georg; Fuhr, Karl; and Schnell, Hermann, 3,914,166.

Heininger, Richard T., to Gem Industries, Inc. Welded corner construction. 3,914,062, Cl. 403-231.000.

Heins, Conrad F.: *See*—
Forler, C. Richard; and Heins, Conrad F., 3,914,145.

Heintz, Karl O.: *See*—
Heilhecker, Joe K.; Wood, Donald B.; and Heintz, Karl O., 3,913,688.

Heitmann, Uwe, to Hauni-Werke Korber & Co. KG. Method and apparatus for testing cigarettes or the like. 3,913,381, Cl. 73-45.100.

Held, Llewellyn John: *See*—
Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, 3,914,396.

Helding, Norman A., to Sun Chemical Corporation. Radiation lamp reflector assembly. 3,914,594, Cl. 240-41.350.

Helfert, Herbert: *See*—
Jorek, Helmut; Fikentscher, Rolf; Kurze, Joachim; and Helfert, Herbert, 3,914,496.

Helfrich, Robert H. Building frame structure for hillsides. 3,913,285, Cl. 52-64.000.

Helfrich, Wolfgang, to Hoffmann-La Roche Inc. Electro-optical cell. 3,914,020, Cl. 350-160.0LC.

Heller, Alfred L.: *See*—
Driskell, Thomas D.; Heller, Alfred L.; and Koenigs, Joseph F., 3,913,229.

Helm, Dietrich; and Schepp, Horst, to Schering AG. Method for making heat-hardenable thickened epoxy resin masses. 3,914,204, Cl. 260-47.0EN.

Henderson, Donald LeRoy: *See*—
Koch, James Allan; Nelson, Roger John; and Henderson, Donald LeRoy, 3,913,449.

Hendlin, David; Stapley, Edward O.; Del Val, Sagrario Mochales; and Mata, Justo Martinez, to Merck & Co., Inc. (−)(Cis-1,2-epoxypropyl)-phosphonic acid and salts thereof. 3,914,231, Cl. 260-268.00R.

Hendricks, Jerry V.: *See*—
Crumbliss, Robert T.; and Hendricks, Jerry V., 3,913,505.

Hennessey, Russell J., to Hoerner Waldorf Corporation. Multiple can combination package. 3,913,739, Cl. 206-434.000.

Hentschel, Hans-Dieter: *See*—
Grenzendorfer, Dieter; and Hentschel, Hans-Dieter, 3,913,504.

Hentschel, William J.: *See*—
Burg, Stanley P.; and Hentschel, William J., 3,913,661.

Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, to Dornier System GmbH. Centering means for processing shafts having a spherical shaft end. 3,913,902, Cl. 269-8.000.

Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, to Dornier System GmbH. Lower bearing for rotors which revolve at high speeds and have an essentially vertical axis of rotation. 3,913,991, Cl. 308-144.000.

Herbert, Werner: *See—*
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,902.
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,991.

Herchenroeder, Louis W., to Westinghouse Electric Corporation. Selsyn digital transducer. 3,914,759, Cl. 340-347.0SY.

Hercules Incorporated: *See—*
Haynes, James N., 3,914,262.
Kim, Charles W.; and Liu, Chia-Seng, 3,914,365.
Tennent, Howard G., 3,914,509.
Weldy, Winfred E., 3,914,504.

Hernsjo, Nils Einar; and Melander, Rolf Edmund, to Hernsjo, Nils Einar. Snap-hook holder. 3,913,515, Cl. 114-230.000.

Herr, Charles H., to Caterpillar Tractor Co. Control system for modular transmission. 3,913,415, Cl. 74-752.00C.

Herrmann, Manfred: *See—*
Vollmer, Karl-Otto; and Herrmann, Manfred, 3,914,343.

Hershberg, Emanuel B.: *See—*
Knapp, Julius Z.; and Hershberg, Emanuel B., 3,914,058.

Hesler, Joseph P.; and Korzekwa, Samuel M., to General Electric Company. Static inverter. 3,914,680, Cl. 321-18.000.

Hess, Hans-Jurgen E.: *See—*
Cronin, Timothy H.; and Hess, Hans-Jurgen E., 3,914,423.

Hetzel, Max, to Elresor SA. Band-pass filter and method of making same. 3,914,719, Cl. 333-71.000.

Heublein, Inc.: *See—*
Servadio, Gildo J.; Perreault, Arthur W.; and Jones, John C., 3,914,442.

Hewlett-Packard Company: *See—*
Grossi, Brian John, 3,914,786.
Holden, Thomas E.; and Linsky, Mark S., 3,914,658.

Heyman, Philip Michael: *See—*
Carlson, Curtis Raymond; Gorog, Istvan; and Heyman, Philip Michael, 3,914,711.

Heyne, Clarence A.: *See—*
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,914,152.

Heywang, Hermann: *See—*
Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, 3,913,224.

Hickox, Thomas A.: *See—*
Coker, Charles Walter, Jr.; Hickox, Thomas A.; Lynott, John Joseph; and O'Rourke, Thomas Frank, 3,914,789.

Hicks, Darrell D.: *See—*
Carlos, Donald D.; and Hicks, Darrell D., 3,914,208.

Hicks, Mearle G.: *See—*
Brumleve, Thomas D.; Hicks, Mearle G.; and Jones, Milton O., 3,914,732.

Hiestand, Armin; and Jager, Horst, to Ciba-Geigy AG. N-heterocyclic perfluoroalkylcarboxylic acid esters. 3,914,225, Cl. 260-248.0NS.

Highratio Screens Ltd.: *See—*
McGurk, Stanley E.; and Cowan, Wavell Frederick, 3,914,172.

Hill, Bertha Toliver. Soap receptacle and dispensing device. 3,913,808, Cl. 222-565.000.

Hill, Harold Taylor; and Munro, Robert, to Wellworthy Limited. Fabricated piston with sprayed groove. 3,914,574, Cl. 219-121.0EM.

Hill, Harold Wayne, Jr.; and Campbell, Robert W., to Phillips Petroleum Company. Copolyamide-solvent systems. 3,914,150, Cl. 156-308.000.

Hill-Rom Company, Inc.: *See—*
Adams, James S.; and Stevens, William M., 3,913,153.

Hiller, Trueman W., to Weil-McLain Company, Inc. Liquid dispensing and vapor recovery system. 3,913,633, Cl. 141-45.000.

Himmelman, Larry David, to Town Tire Services Limited. Method of forming inflation bladder and eliminating trapped gas from a molded bladder seam. 3,914,367, Cl. 264-219.000.

Hinnergardt, Larry C., to United States of America, Army. Method of producing freeze-dried bacon slices. 3,914,446, Cl. 426-385.000.

Hirose, Kenichi: *See—*
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.

Hirose, Kiyoshi; Shiozawa, Kaoru; and Saito, Yuzi, to Mitsui Shipbuilding and Engineering Co., Ltd. Apparatus for tack welding of flange. 3,913,819, Cl. 228-4.100.

Hirota, Kinya: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.

Hirsch, Nathan: *See—*
Hunsperger, Robert G.; and Hirsch, Nathan, 3,914,784.

Hirschberger, Leonard: *See—*
Schoenholz, Daniel; Petersen, Arthur W.; and Hirschberger, Leonard, 3,914,197.

Hirschhorn, Ralph Isaac; and Bhusri, Gurcharan Singh, to North American Philips Corporation. Automatic grounding system. 3,914,656, Cl. 317-9.00R.

Hitachi Electronics, Ltd.: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Hitachi, Ltd.: *See—*
Hara, Kouichi, 3,914,605.
Kiwaki, Hisakatsu; Onoda, Yoshimitsu; and Ibamoto, Masahiko, 3,914,672.
Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, 3,914,390.
Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, 3,913,493.
Misawa, Yutaka; and Yagi, Hideyuki, 3,913,217.
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Morishita, Hajime; and Nonogaki, Saburo, 3,914,462.
Sasaki, Soji; Tadauchi, Masaharu; and Ito, Takashi, 3,913,387.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.
Terasawa, Yoshio, 3,914,783.

Hitachi Seiki Co., Ltd.: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.

Ho, Shu-Kuang: *See—*
Koplow, Harold Stanley; Eberle, Fritz; Ho, Shu-Kuang; and Lesnick, Edward, 3,913,721.

Hobbs, Charles C.; and van't Hof, Hendrik A., to Celanese Corporation. Liquid phase oxidation of alcohols to form carboxylic acids therefrom. 3,914,296, Cl. 260-530.00R.

Hobrough Limited: *See—*
Crawley, Barry G., 3,914,051.

Hoch, Norris R., to Jeff-Ko Manufacturing Co., Inc. Truck body closure. 3,913,969, Cl. 296-100.000.

Hodge, Walter D.: *See—*
Poister, Clarence E.; Tyrrell, Philip A.; and Hodge, Walter D., 3,913,150.

Hodgson, Rodney Trevor: *See—*
Dreyfus, Russell Warren; and Hodgson, Rodney Trevor, 3,914,655.

Hoechst Aktiengesellschaft: *See—*
Kleiner, Hans-Jerg; and Landauer, Franz, 3,914,345.
Lerch, Ulrich; and Granzer, Ernold, 3,914,236.
Schnabel, Horst; and Mitzlaff, Michael, 3,914,304.
Stache, Ulrich; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, 3,914,213.

Hoerner Waldorf Corporation: *See—*
Hennessey, Russell J., 3,913,739.

Hoff, Dale R.: *See—*
Patchett, Arthur A.; Mrozik, Helmut H.; and Hoff, Dale R., 3,914,418.

Hoffken, Erich; Pflipsen, Dieter; and Trenkler, Hansjorg, to Vacmetal Gesellschaft fur Vakuum-Metallurgie mbH. Vacuum vessel sealing arrangement. 3,913,950, Cl. 285-55.000.

Hoffman-La Roche Inc.: *See—*
Bohni, Erika, 3,914,434.
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,234.

Hoffman, William: *See—*
Behnk, Donald J., 3,913,165.

Hoffmann-La Roche Inc.: *See—*
Cannalonga, Marco Alfred; and Czarecki, Louis Vincent, 3,914,430.
Gutzwiller, Juerg Albert Walter; and Uskokovic, Milan Radoje, 3,914,235.
Helfrich, Wolfgang, 3,914,020.
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,232.
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,233.
Okamoto, Yoshiyuki; Riker, Walter Franklin, Jr.; and Udenfriend, Sidney, 3,914,283.
Surmatis, Joseph Donald; and Walser, Armin, 3,914,256.

Hogan, James A., to Honeywell Inc. Process controller having electronic manual control. 3,914,699, Cl. 328-127.000.

Hoganas Aktiebolag: *See—*
Wastenson, Erik Goran; and Carlsson, Gote Allan, 3,913,707.

Holbrook, Legrand K.; and Ostler, David S., to Medical Development Corporation. Vacuum-operated fluid bottle and system. 3,913,780, Cl. 220-200.000.

Holden, Homer N.; Shokler, Morris; and Lamden, Sidney K., to Dayco Corporation. Gas conduit and method of making same. 3,913,622, Cl. 138-121.000.

Holden, Thomas E.; and Linsky, Mark S., to Hewlett-Packard Company. Compact transformer with integral connector. 3,914,658, Cl. 317-99.000.

Holdenried, Willy; and Hamma, Karlmann, to Zahnradfabrik Friedrichshafen AG. Fluid-actuated drive system for automotive vehicle. 3,913,695, Cl. 180-6.480.

Holdsworth, Eric, to Turner Machinery Limited. Tanning machinery. 3,913,360, Cl. 69-30.000.

Hollander, Betty Ruth; Coppola, Theodore Anthony; and McKinley, William Earl, to Omega Engineering, Inc. Connectors. 3,914,008, Cl. 339-259.00R.

Hollis, Clinton R., to International Paper Company. Apparatus for opening tubes of flexible material. 3,913,463, Cl. 93-28.000.

Holloway, Norman C. Insulative terminal cap. 3,914,529, Cl. 174-5.00R.

Holloway, Thomas M.; Janu, George J.; Kuhar, Paul W.; and Laakaniemi, Richard N., to Johnson Service Company. Fluid energy monitoring apparatus. 3,913,344, Cl. 62-176.000.

Holmes, Daniel D.; and Weiss, Albert, to United States of America, Navy. Active passive fuzing system. 3,913,485, Cl. 102-70.20P.
Holmes, Donald E., to Clark Equipment Company. Dual filter assembly. 3,914,176, Cl. 210-132.000.
Holt, Lemmie C.; and Hansen, Ernest Paul. Nutrient composition and method for making same. 3,914,438, Cl. 426-61.000.
Holtz, Joachim, to Siemens Aktiengesellschaft. System for attenuating vertical oscillations of a suspended track bound propulsion vehicle. 3,914,669, Cl. 318-135.000.
Holtz, Joachim, to Siemens Aktiengesellschaft. Apparatus for damping oscillations in the propulsion direction in a magnetically suspended propulsion vehicle driven by a synchronous linear motor. 3,914,670, Cl. 318-135.000.
Holzer, Anton, to Wien-Fischamender Metallwarenfabrik Josef Suschny & Sohnne. Apparatus for driving pegs into pre-bored holes. 3,913,815, Cl. 227-93.000.
Honeywell Inc.: *See—*
Broekstra, Bert; and Wilwerding, Dennis J., 3,914,647.
Hogan, James A., 3,914,699.
Honeywell Information Systems Inc.: *See—*
Brown, James L., 3,914,744.
Sullivan, James F., 3,914,679.
Honig, Helmut: *See—*
Dillenburg, Helmut; Honig, Helmut; and Fuchs, Paul-Wilhelm, 3,914,380.
Hoogovens IJmuiden BV: *See—*
van Laar, Jacobus; Felthuis, Jacob; Weber, Hendrik Gustaaf Otto; and Olivierse, Hendrik, 3,913,617.
Hook, Glen C., to Vann Signal Devices, Inc. Pressure change responsive alarm apparatus. 3,914,755, Cl. 340-274.000.
Hooton, Norris A.; and Jannasch, Norman E., to Bendix Corporation, The. Coating for protecting a carbon substrate in a moist oxidation environment. 3,914,508, Cl. 428-408.000.
Hoover, Michael C.; and Long, William C., to Petty-Ray Geophysical, Inc. Compact viewing assembly for light sensitive sorting machine. 3,914,601, Cl. 250-226.000.
Hoplock, Donald A. Mirror assembly. 3,914,029, Cl. 350-289.000.
Hopwood, William J.: *See—*
Haddock; Ernest; and Hopwood, William J., 3,914,300.
Horinaga, Hiroshi: *See—*
Matsushita, Takeshi; Horinaga, Hiroshi; Ohtsu, Takaji; and Hayashi, Hisao, 3,914,781.
Horlitz, Carl Frederick, Jr., to Combustion Engineering, Inc. Vapor generator heat recovery system. 3,913,330, Cl. 60-678.000.
Hornak, Leonard P.: *See—*
Shallenberger, John M.; Hornak, Leonard P.; and Desmarchais, Walter E., 3,914,613.
Hornby, Michael Robert; and Tunstall, David Frank, to British Titan Limited. Measurement of absorption of radiation. 3,914,604, Cl. 250-272.000.
Horowitz, Frederic, to Georgia-Pacific Corporation. Polyamide/formaldehyde/epichlorohydrin wet strength resins and use thereof in production of wet strength paper. 3,914,155, Cl. 162-167.000.
Horowitz, Samuel Jacob, to Du Pont de Nemours, E. I., and Company. Oxygen detector having a platinum electrode on a zirconia electrolyte. 3,914,169, Cl. 204-195.00S.
Horsch, Joachim, to International Harvester Company. Clutch shaft with fluid distribution means. 3,913,616, Cl. 137-580.000.
Hoshino, Norio: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 3,914,713.
Hosoda, Kirokuro: *See—*
Shiina, Naonori; and Hosoda, Kirokuro, 3,914,361.
Hoss, Andre Gabriel: *See—*
Brulfert, Andre; and Hoss, Andre Gabriel, 3,914,075.
Hothem, John H.: *See—*
Cable, Stephen J.; Fuller, Lee R.; and Hothem, John H., 3,914,099.
Hovey, Ralph James, to Bunker Ramo Corporation. Method for plating of plastic. 3,914,520, Cl. 428-458.000.
Howard, Willis W.; Maurer, William C.; and Lock, Everett H., to Exxon Production Research Company. Pump alarm system. 3,914,752, Cl. 340-242.000.
Howland, Howard; and Pfleger, Frank. Photogravure process for preparing a gravure press for multicolor printing. 3,913,477, Cl. 101-211.000.
Howorth Air Conditioning Limited: *See—*
Howorth, Frederick Hugh, 3,913,156.
Howorth, Frederick Hugh, to Howorth Air Conditioning Limited. Levitation beds. 3,913,156, Cl. 5-348.00R.
Hoye, Peter Albert Theodore; and Hargreaves, Roger Geoffrey, to Albright & Wilson Limited. Certain tetraorganotin compounds used as insecticides. 3,914,431, Cl. 424-288.000.
Hubbard, Robert William: *See—*
Hutchings, Bernard David Francis; and Hubbard, Robert William, 3,913,690.
Hubbard, Tom Watson, Jr. Means and apparatus for controlling fluid currents and selectively preserving and modifying topography subjected thereto. 3,913,333, Cl. 61-4.000.
Huber, Paul: *See—*
Schiessl, Alois; and Huber, Paul, 3,913,482.
Hubing, James H.; and Mongold, Gerald H., to Texas Instruments Incorporated. Coaxial ring rotary joint. 3,914,715, Cl. 333-24.00R.
Hudson, James L.: *See—*
Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., 3,914,050.
Hudson Oxygen Therapy Sales Company: *See—*
Price, John H., 3,913,607.
Huffman, Tommie R.; and Coleman, Michael G., to Motorola Inc. Method of manufacturing a light coupled monolithic circuit by selective epitaxial deposition. 3,914,137, Cl. 148-175.000.
Hug, William F., to Xerox Corporation. Pulsed metal or metal halide lamps for photocopying applications. 3,914,649, Cl. 315-241.00R.
Hughes Aircraft Company: *See—*
Berry, Robert L., 3,913,339.
Gaskill, James R., Jr.; and Weill, Lawrence R., 3,914,589.
Hunsperger, Robert G.; and Hirsch, Nathan, 3,914,784.
Moulin, Norbert L., 3,913,206.
Stover, Harry L.; and Leedy, Hayden M., 3,914,708.
Hughes, Thomas R., to Chevron Research Company. Process of averaging saturated hydrocarbons with a catalytic mass comprising a catalytic component for alkane dehydrogenation and a catalytic component for olefin averaging. 3,914,330, Cl. 260-676.00R.
Hughes Tool Company: *See—*
Scales, Stanley R.; and Prince, Richard B., 3,913,988.
Hujik, Ladislav, to Bata Show Company, Inc. Ejector device for injection molding apparatus. 3,914,086, Cl. 425-437.000.
Hull, John R.: *See—*
Alling, Richard; and Hull, John R., 3,913,994.
Humber, Leslie G.: *See—*
Bruderlein, Francois T.; and Humber, Leslie G., 3,914,305.
Hunden, Bob L., to Solis, Dennis A. Dual tire wheel and method of making same. 3,913,981, Cl. 301-36.00R.
Hunsaker, Roger C.: *See—*
Arrington, Earl J.; Deal, Jerry E.; and Hunsaker, Roger C., 3,914,069.
Hunsperger, Robert G.; and Hirsch, Nathan, to Hughes Aircraft Company. Ion Implanted gallium arsenide semiconductor devices fabricated in semi-insulating gallium arsenide substrates. 3,914,784, Cl. 357-61.000.
Hunt, Theodore R., to Data Time, Inc. Telephone answering device with programmed electronic sequence control. 3,914,551, Cl. 179-6.00R.
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., to Eastman Kodak Company. Synchronizing control apparatus for electrophotographic apparatus utilizing digital computer. 3,914,047, Cl. 355-16.000.
Hurley, Joseph John, to J. & P. Coats Limited. Supply apparatus for cryogenic liquids. 3,913,340, Cl. 62-45.000.
Huskins, Chester W., to United States of America, Army. Propellant with mixed carboxyl polybutadiene and carboranyl methacrylate-butadiene-acrylic acid terpolymer as binder. 3,914,140, Cl. 149-19.200.
Huskins, Chester W., to United States of America, Army. Terpolymer-butadiene-carboranyl methacrylate, and acrylic acid. 3,914,206, Cl. 260-80.700.
Hutchings, Bernard David Francis; and Hubbard, Robert William, to Pye Limited. Crane load indicating arrangement. 3,913,690, Cl. 177-25.000.
Hutchison, Robert B., to Emery Industries, Inc. Useful wax compositions. 3,914,131, Cl. 106-268.000.
Huyck, Robert T., to Roberts-Gordon Appliance Corporation. Apparatus for, and method of, oxidizing a gaseous mixture containing a combustible component. 3,914,088, Cl. 431-5.000.
Hyson, Archibald Miller, to E.I. Du Pont de Nemours & Company. Herbicidal complex and formulations thereof. 3,914,122, Cl. 71-92.000.
Hyson, Archibald Miller, to Du Pont de Nemours, E. I., and Company. Bromacil/diuron complex. 3,914,230, Cl. 260-260.000.
Hytrac Conveyors Limited: *See—*
Coleson, Ronald Bruce; and Wood, Joel Paul, 3,913,494.
Hyundai Motor Company: *See—*
Sang-Yol, An, 3,914,350.
I.E.R.A.M. (Institut Europeen de Recherches et d'Applications Mediales): *See—*
Guichard, Jean-Claude; Gaillard, Anne; and Blainie, Jean Marie Michel Paul, 3,913,631.
I-T-E Imperial Corporation: *See—*
May, William E.; and Netzel, Philip C., 3,914,659.
McConnell, Lorne D.; and Aumayer, Hansruedi, 3,914,569.
Waldron, James E., 3,914,664.
Waldron, James E., 3,914,667.
Ibamoto, Masahiko: *See—*
Kiwaki, Hisakatsu; Onoda, Yoshimitsu; and Ibamoto, Masahiko, 3,914,672.
Ideal Toy Corporation: *See—*
Cooper, Julius, 3,913,914.
Iff, Fritz. Wire stripper. 3,913,425, Cl. 81-9.50A.
Iguchi, Nobuyoshi: *See—*
Nakadai, Tadanobu; Nasuno, Seiichi; and Iguchi, Nobuyoshi, 3,914,436.
Ikeda, Tsuneo; Sato, Katsunobu; and Sugiyama, Hiroshi, to Sumitomo Chemical Company, Ltd. Methine compounds. 3,914,273, Cl. 260-465.00D.
Ikegami, Yoshio, to Kobe Steel, Ltd. Apparatus for disposing of a wire terminal in a wire winding machine. 3,913,858, Cl. 242-25.00A.
Ilfrey, William T.: *See—*
Todd, William W.; Ilfrey, William T.; and Lloyd, James R., 3,913,668.
Illinois Tool Works Inc.: *See—*
Enstrom, Robert Victor, 3,913,685.
Lacey, Robert L., 3,913,566.

Olsen, Robert C., 3,913,738.
Speedie, Robert, 3,913,618.
Ilvespaa, Atso, to Ciba-Geigy Corporation. (4-Or 5-nitroimidazolyl)-imidazole compounds. 3,914,248, Cl. 260-309.600
Imamura, Takaaki; Matsui, Masayuki, Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, to Bridgestone Tire Co., Ltd. Rubber articles reinforced with high modulus fiber cords and pneumatic tires reinforced with such fiber cords. 3,913,652, Cl. 152-361.00R.
IMC Magnetics Corporation: *See—*
Friese, Karl E., 3,914,071.
Imperial Chemical Industries Limited: *See—*
Brown, Alistair Chalmers Ramsay; and Ballard, Denis George Harold, 3,914,513.
Cobb, Leslie Hamilton; Mann, David; and Remmington, Timothy Alan, 3,914,471.
Rennie, Robert Allan Campbell; Crosby, John; and Paton, Robert Michael, 3,914,267.
Imperial-Eastman Corporation: *See—*
Strybel, Richard V., 3,913,364.
Inamorato, Jack Thomas, to Colgate-Palmolive Company. Method of preparing liquid detergent compositions. 3,914,185, Cl. 252-546.000.
Indian Head, Inc.: *See—*
Copp, Donald G.; Ellsworth, James C.; and Mosher, Charles E., 3,913,773.
Industrial Nucleonics Corporation: *See—*
Cho, Boong Youn; and Utt, Orval L., 3,914,607.
Wilhelm, Robert G., Jr.; and Donoghue, John Francis, 3,914,585.
Ing. C. Olivetti & C., S.p.A.: *See—*
Maquignaz, Mario; Benedetto, Bruno; and Lingeri, Antonio, 3,913,476.
Ingersoll-Rand Company: *See—*
Gyongyosi, Laszlo; and Whetstone, Everett A., 3,913,687.
Ingle, Harold R., Jr.: *See—*
Raiford, Morgan B.; Reeves, Charles R.; and Ingle, Harold R., Jr., 3,913,274.
Ingle, James Flagg, to Bell Telephone Laboratories, Incorporated. Digital readout for displaying both long term and short term average values of a signal. 3,914,758, Cl. 340-336.000.
Innocenti Santeustacchio S.p.A.: *See—*
Galletti, Cesare, 3,913,367.
Inoue Rubber Company, Ltd.: *See—*
Sawa, Hiroshi; Aratani, Isamu; and Narita, Koji, 3,914,482.
Institut National de la Recherche Agronomique: *See—*
Maubois, Jean-Louis Joseph; Mocquot, Germain Pierre Charles Gabriel; and Vassal, Louis Jean, 3,914,435.
Instituttet for Produktudvikling: *See—*
Munster, Ebbe; and Ponsaing, Per, 3,914,742.
Instrumentation Specialties Company: *See—*
Allington, William B., 3,914,168.
International Business Machines Corporation: *See—*
Beckerman, Martin; Murphy, John A.; Orlandi, John V.; and Smith, George W., 3,914,000.
Bowdle, Raymond Ralph; and Laybourn, Robert Junior, 3,913,722.
Coker, Charles Walter, Jr.; Hickox, Thomas A.; Lynott, John Joseph; and O'Rourke, Thomas Frank, 3,914,789.
Cooper, Donald Walter; and Unruh, James Bradley, 3,914,745.
Dreyfus, Russell Warren; and Hodgson, Rodney Trevor, 3,914,655.
Guzman, Adolfo M.; and Lawes, Harlan D., 3,914,631.
Keefe, George E.; Lin, Yeong S.; and Rosier, Laurence L., 3,914,751.
Logue, Joseph C., 3,914,760.
Malaviya, Shashi Dhar, 3,914,749.
Nussbaumer, Henri J., 3,914,588.
International Flavors & Fragrances Inc.: *See—*
Chappell, Robert L.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred H., 3,914,322.
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.
Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, 3,914,451.
International Harvester Company: *See—*
Horsch, Joachim, 3,913,616.
Olsson, Nils O.; and Logue, Robert W., 3,913,683.
Packard, Norman M.; and Gaines, John W., 3,913,199.
Rouse, Paul L.; and Francis, Robert L., 3,913,589.
Tamburino, James C.; and Venere, Lawrence A., 3,913,943.
Wendling, John E., 3,914,566.
International Nickel Company, Inc., The: *See—*
O'Neill, Charles Edward; Sridhar, Ramamritham; and Bell, Malcolm Charles Evert, 3,914,124.
International Paper Company: *See—*
Brownlee, Milton A.; and Lanham, Robert L., 3,913,825.
Brownlee, Milton A.; and Tomlin, Thomas A., 3,913,826.
Hollis, Clinton R., 3,913,463.
International Standard Electric Corporation: *See—*
Maelstaf, Serge Marcel Yves; and Altesleben, Jacques Joseph Antoine, 3,914,724.
Mason, Frederick Percival, deceased; and Patience, Brian Michael, 3,914,682.
International Telephone and Telegraph Corporation: *See—*
Einem, Robert E.; and Vertefeuille, Raymond, 3,914,583.
Frazee, Foster Wayne, 3,914,556.
Madonian, Vahe Samuel; and Douglas, Joseph Daniel, 3,914,676.
Mc Cartney, Ronald L., 3,914,015.
Ion Tech, Inc.: *See—*
Reader, Paul D.; and Kaufman, Harold R., 3,913,320.
Irwin, John M.; and Powell, Noble R., to General Electric Company. Serial two's complementer. 3,914,590, Cl. 235-164.000.
Irwin, Richard C., to ACF Industries, Incorporated. Means for securing flexible diaphragm in fluid actuator for valves. 3,913,883, Cl. 251-25.000.
Ishida, Hisashi: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.
Ishida, Masayuki: *See—*
Fujii, Seiji; Kamata, Masamoto; Ishida, Masayuki; and Kuwamoto, Hiroshi, 3,913,363.
Ishihara Sangyo Kaisha Ltd.: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Shigehara, Itaru; and Komyoji, Terumasa, 3,914,240.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kano, Saburo; Sasaki, Tatsuo; and Kobayashi, Toshihiro, 3,914,098.
Ozaki, Masahiko, 3,913,775.
Tsuji, Shoichi, 3,913,845.
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, 3,914,112.
Ishizaki, Hiroyuki: *See—*
Murase, Kenji; Ishizaki, Hiroyuki; and Kurahashi, Keizo, 3,914,761.
Ito, Naganori: *See—*
Aikawa, Hiroshi; and Ito, Naganori, 3,913,938.
Ito, Takashi: *See—*
Sasaki, Soji; Tadauchi, Masaharu; and Ito, Takashi, 3,913,387.
ITT Industries, Inc.: *See—*
Burgdorf, Jochen; Klose, Karl-Heinz; and Storzel, Karl, 3,913,709.
Itzken, Irving: *See—*
Pike, Charles T.; and Itzken, Irving, 3,914,709.
Ivy, John B.; Willis, Gordon G.; and Kelsoe, David C., to Dow Chemical Company, The. Process for making cis-1,3-dichloropropene. 3,914,167, Cl. 204-163.00R.
Iwai, Yoshihiro; and Tanaka, Kunihiko, to Nippon Hoso Kyokai. Apparatus for photographing animation films. 3,914,033, Cl. 352-87.000.
Iwasaki Denki Kabushiki Kaisha: *See—*
Sugiura, Minoru; and Maseki, Kyou-Ichi, 3,914,636.
J. H. Day Company, The: *See—*
Updegrove, Louis B., 3,913,238.
J. M. Huber Corporation: *See—*
Aboytes, Peter, 3,914,148.
Aboytes, Peter, 3,914,149.
J. M. Voith GmbH: *See—*
Flamig, Hans, 3,913,240.
J. & P. Coats Limited: *See—*
Hurley, Joseph John, 3,913,340.
Jack, Harry Ross Scarlett; and Nobbs, Arthur Joseph, to Triplex Safety Glass Company Limited. Methods of toughening a glass sheet. 3,914,119, Cl. 65-104.000.
Jackson, Harold W., to Bendix Corporation, The. Circuit to raise a quantity to a predetermined power. 3,914,624, Cl. 307-229.000.
Jacobs, Mark C.: *See—*
Blazer, Sidney J.; and Jacobs, Mark C., 3,913,779.
Jacobsen Manufacturing Company: *See—*
Kaercher, William C., Jr.; Haffner, Donald G.; and Saiia, Anthony J., 3,913,682.
Jacobson, Elliott: *See—*
Rusz, Tibor; and Jacobson, Elliott, 3,913,379.
Jaeger, Karl Heinrich, to Solco Basel AG. Antitussive codeine composition. 3,914,425, Cl. 424-260.000.
Jaffe, Albert: *See—*
Brun, Andre; Jaffe, Albert; and de Panafieu, Philippe, 3,913,669.
Jager, Heinz, to Westfalia Dinnendahl Groppel AG. Process and means for cooling cement. 3,913,848, Cl. 241-54.000.
Jager, Horst: *See—*
Hiestand, Armin; and Jager, Horst, 3,914,225.
Jagucki, Edward: *See—*
Osterholtz, Carl E.; Agostinelli, Edward; and Jagucki, Edward, 3,914,527.
James, Harlan A., to Western Geophysical Company of America. Connector assembly for a bottom-drag seismic cable. 3,914,014, Cl. 339-104.000.
James, Larry Rodger, to Paccar Inc. Transmission shift inhibitor. 3,913,700, Cl. 180-82.00R.
James, Newell E. Easy-on fish hook clip. 3,913,185, Cl. 24-237.000.
Jameson, James J., to Gardner-Denver Company. Multispeed power transmission with plural countershafts. 3,913,411, Cl. 74-360.000.
Jannasch, Norman E.: *See—*
Hooton, Norris A.; and Jannasch, Norman E., 3,914,508.
Janssen Pharmaceutica, N.V.: *See—*
Soudijn, Willem; and van Wijngaarden, Ineke, 3,914,238.
Jantz, Le Vern D.: *See—*
Kochn, Franklin E.; Esau, Robert N.; and Jantz, Le Vern D., 3,913,934.
Janu, George J.: *See—*
Holloway, Thomas M.; Janu, George J.; Kuhar, Paul W.; and Laakaniemi, Richard N., 3,913,344.

Japan Exlan Company Limited: *See—*
Fukushima, Keitaro; Kishimoto, Soichiro; and Nosaka, Yoshinori, 3,914,394.

Jardin, Hans; Leiter, Robert; and Lutz, Alfons, to Webasto-Werk W. Baier KG. Clamping device for rigid automobile sliding roofs. 3,913,970, Cl. 296-137.00F.

Jardin, Hans, to Webasto-Werk W. Baier KG. Adjustable lifting mechanism for automobile sliding roof. 3,913,972, Cl. 296-137.00F.

Jayne, Gerald John Joseph: *See—*
Elliott, John Scotchford; Jayne, Gerald John Joseph; and Barber, Rodney Ian, 3,914,241.

Jeff-Ko Manufacturing Co., Inc.: *See—*
Hoch, Norris R., 3,913,969.

Jenkinson, Richard D.: *See—*
Miller, Walter A.; and Jenkinson, Richard D., 3,914,501.

Jensen, Fred C., to Park-Ohio Industries, Inc. Apparatus for inductively heating the bearing surfaces of a crankshaft. 3,914,572, Cl. 219-10.570.

Jensen, Klaus: *See—*
Wienand, Michael; Jensen, Klaus; Primessing, Franz; and Alfter, Franz-Werner, 3,914,147.

Jepson, Bernhart E., to United States of America, Energy Research and Development Administration. Method for separating isotopes. 3,914,373, Cl. 423-2.000.

Jeromin, Lothar S., to Xerox Corporation. Signal amplification by illumination of a partially developed latent electrostatic image. 3,914,609, Cl. 250-315.00A.

Jersey Nuclear-Avco Isotopes, Inc.: *See—*
Pike, Charles T.; and Itzken, Irving, 3,914,709.

Jewell, Richard A., to Du Pont de Nemours, E. I., and Company. 1,3,5-s-Triazines. 3,914,224, Cl. 260-248.0NS.

Jewett, Aaron R. Musical recording and method and apparatus therefor. 3,913,443, Cl. 84-1.280.

Jeyes, John Anthony: *See—*
Wentworth, Philip Rossell; and Jeyes, John Anthony, 3,913,547.

Jobe, John D., to Shell Oil Company. Monitor for detecting surfactants in liquid petroleum products. 3,913,385, Cl. 73-61.10R.

Jodoin, Paul. Tree trimmer. 3,913,304, Cl. 56-235.000.

Johansson, Anders H.; and Bond, William C., Jr., to Copolymer Rubber & Chemical Corporation. Method and composition for protecting rubber against oxidative attack utilizing uncured EPM or EPDM interpolymer. 3,914,478, Cl. 427-385.000.

Johansson, Haldor Ingemar; Lundgren, Helga Katarina; and Joustra, Marius Klaus, to Pharmacia Fine Chemicals AB. Composition in bead form containing a water-insoluble polysaccharide activated by cyanogen halide, and a process for the preparation of same. 3,914,183, Cl. 252-184.000.

Johnson, Clare W.: *See—*
Johnson, Ivan L., 3,913,349.

Johnson, Daniel H.; and Johnson, Harry T. Baler shield. 3,913,967, Cl. 296-1.00R.

Johnson, Earl Willard: *See—*
Nelsen, Roger Jacob; and Johnson, Earl Willard, 3,913,366.

Johnson, Ernest D., to Westmont Industries. Safety switching for passenger conveyor. 3,913,723, Cl. 198-16.00R.

Johnson, Floyd O., to Varian Associates. High power dry load in grooved waveguide. 3,914,714, Cl. 333-22.00R.

Johnson, Frederick Stanley; and Longstaff, Kenneth, to British Leyland UK Limited. Ignition coil. 3,914,665, Cl. 317-157.600.

Johnson, Harry T.: *See—*
Johnson, Daniel H.; and Johnson, Harry T., 3,913,967.

Johnson, Ivan L., to Johnson, Ivan L.; and Johnson, Clare W. Ice maker with swing-out ice cube system. 3,913,349, Cl. 62-352.000.

Johnson, Lowell A., to Guardian Electric Manufacturing Co. Timing circuit apparatus for use with vehicles. 3,914,663, Cl. 317-142.00R.

Johnson, Marlyn D.: *See—*
Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., 3,913,827.

Johnson, Morris A.; and Yang, Kang, to Continental Oil Company. Catalyzed halogen exchange process. 3,914,327, Cl. 260-658.00R.

Johnson, Roger E.; and Sawai, Joe Y., to Ford Motor Company. Trim separation. 3,913,272, Cl. 51-5.00C.

Johnson, Roger E.: *See—*
Augustin, Eugene H.; Johnson, Roger E.; and Rakestraw, Thomas L., 3,913,812.

Johnson Service Company: *See—*
Holloway, Thomas M.; Janu, George J.; Kuhar, Paul W.; and Laakaniemi, Richard N., 3,913,344.
Matthews, Russell Byron, 3,914,092.

Johnson, Steven J.: *See—*
Alliston, William H.; Johnson, Steven J.; and Mutafelija, Boris A., 3,914,795.

Johnson, Wendell D., to Qualitrol Corporation. Pressure relief device for power transformer. 3,914,528, Cl. 174-11.00R.

Johnston, James V., to United States of America, Army. Digital pulse rebalance accelerometer. 3,913,406, Cl. 73-516.00R.

Johnston, Mack S. Keg adapter valve. 3,913,608, Cl. 137-322.000.

Jones, Cecil M., to Norton Company. Ball grinding ceramic wheel containing manganese dioxide. 3,913,281, Cl. 51-308.000.

Jones, Charles H.; and Wolfe, Peter N., to Westinghouse Electric Corporation. Moving window sonar display system. 3,914,730, Cl. 340-3.00R.

Jones, Howard S., Jr., to United States of America, Army. Monolithic, electrically small, multi-frequency antenna. 3,914,767, Cl. 343-708.000.

Jones, John C.: *See—*
Servadio, Gildo J.; Perreault, Arthur W.; and Jones, John C., 3,914,442.

Jones, John T.; Ludt, William C.; and Kellogg, Hudson W., to Ethyl Corporation. Monitoring and blending of liquid fuel. 3,913,380, Cl. 73-35.000.

Jones, Marvin L.; and Booth, David W., to United States of America, Army. Propellant with very high burning rate acrylate polymer binder and NF plasticizer. 3,914,139, Cl. 149-19.200.

Jones, Milton O.: *See—*
Brumleve, Thomas D.; Hicks, Mearle G.; and Jones, Milton O., 3,914,732.

Jones, Norman, to Lever Brothers Company. Method of making a restructured meat product. 3,914,459, Cl. 426-645.000.

Jones, Weston C.: *See—*
Belue, James C.; and Jones, Weston C., 3,914,477.

Jordan, Larry L.: *See—*
Dost, Richard W.; Hudson, James L.; and Jordan, Larry L., 3,914,050.

Jorek, Helmut; Fikentscher, Rolf; Kurze, Joachim; and Helfert, Herbert, to Basf Aktiengesellschaft. Antistatic finishing of surfaces. 3,914,496, Cl. 428-279.000.

Joseph Lucas (Industries) Limited: *See—*
Lewis, Geoffrey Arthur, 3,913,317.

Jouffret, Michel: *See—*
Billet, Lucien; and Jouffret, Michel, 3,914,291.
Brunie, Jean Claude; Costantini, Michel; Crenne, Noel; and Jouffret, Michel, 3,914,292.

Joustra, Marius Klaus: *See—*
Johansson, Haldor Ingemar; Lundgren, Helga Katarina; and Joustra, Marius Klaus, 3,914,183.

Juntgen, Harald; Knoblauch, Karl; Gappa, Gunther; and Schwarte, Jurgen, to Bergwerksverband GmbH. Process of removing sulfur oxide from exhaust gases. 3,913,253, Cl. 423-244.000.

Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; and Kushner, Benjamin, to American Building Components, Inc. Apparatus for fabricating wooden frames and the like. 3,913,816, Cl. 227-95.000.

Kabel-und Metallwerke Gutehoffnungshutte AG: *See—*
Loy, Fritz, 3,914,003.

Kabushiki Kaisha Meidensha: *See—*
Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, 3,913,384.

Kabushiki Kaisha Oki Yuka Goeishi Kenkyujo: *See—*
Ueki, Shiro; and Miyata, Yoshimitsu, 3,914,354.

Kabushiki Kaisha Ricoh: *See—*
Namiki, Ryoichi; Matsuo, Kazunori; and Watanabe, Mutsuo, 3,914,045.

Kabushiki Kaisha Suwa Seikosha: *See—*
Nishimura, Izuhiko, 3,914,021.
Numabe, Hitomi, 3,913,312.
Scrocco, Joseph; and Cottingham, Hugh, 3,913,769.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Nagase, Hiroshi; and Ban, Hitoshi, 3,913,392.

Kado, Masaru: *See—*
Konnai, Makoto; Kamata, Hiroshi; and Kado, Masaru, 3,914,270.

Kaercher, William C., Jr.; Haffner, Donald G.; and Saiia, Anthony J., to Jacobsen Manufacturing Company. Controls for a sod cutter blade. 3,913,682, Cl. 172-20.000.

Kaiser, Kent: *See—*
Shaffer, Gary W.; Kitchens, Garry C.; and Kaiser, Kent, 3,914,314.

Kaiser, Reinhold, to Licentia Patent-Verwaltungs. Method of producing a semiconductor device. 3,913,214, Cl. 29-578.000.

Kalbfeld, Jules: *See—*
Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, 3,914,302.

Kalopissis, Gregoire; and Vanlerberghe, Guy, to Societe Anonyme Dite: L'Oreal. Non-ionic surface active agents as cosmetic emulsifiers. 3,914,407, Cl. 424-63.000.

Kamata, Hiroshi: *See—*
Konnai, Makoto; Kamata, Hiroshi; and Kado, Masaru, 3,914,270.

Kamata, Masamoto: *See—*
Fujii, Seiji; Kamata, Masamoto; Ishida, Masayuki; and Kuwamoto, Hiroshi, 3,913,363.

Kambara, Kenjiro; Tanaka, Sakae; and Miyasita, Satoru, to Nippon Steel Corporation. Discharging device of a shaft furnace having cooling means. 3,913,755, Cl. 214-18.00V.

Kamioka, Toshiharu: *See—*
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.

Kamp, Ewald A., to Union Carbide Corporation. Apparatus for the high speed production of non-woven fabrics. 3,914,080, Cl. 425-83.000.

Kane, James; and Schweizer, Hanspeter, to RCA Corporation. Process for forming transition metal oxide films on a substrate and photomasks therefrom. 3,914,515, Cl. 428-432.000.

Kaneda, Satoshi: *See—*
Yonezawa, Kazuo; Nakao, Kaname; Suzuki, Takashi; and Kaneda, Satoshi, 3,914,161.

Kanehira, Hiroshi; and Kurosaki, Syozi, to Kuraray Co., Ltd. Nonwoven batts possessing excellent tensile strength, tear strength and initial modulus. 3,914,497, Cl. 428-288.000.

Kang, Jung Wong, to Firestone Tire & Rubber Company, The. Process for copolymerizing conjugated dienes and alpha-olefins. 3,914,207, Cl. 260-85.30R.

Kanno, Hideo, to Nippon Kogaku K.K. Short-distance correction device in a photographic lens. 3,914,026, Cl. 350-255.000.

Kano, Masafumi: *See—*
Tugukuni, Hideyoshi; Kano, Masafumi; and Chikazoe, Yoshihisa, 3,914,335.

Kano, Saburo; Sasaki, Tatsuo; and Kobayashi, Toshihiro, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Suspension-type preheating system for powdery raw materials. 3,914,098, Cl. 432-106.000.

Kanonas, Thomas S. Breast development apparatus. 3,913,569, Cl. 128-67.000.

Kao Soap Co., Ltd.: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.

Kaplan, Nathan W. Traffic marker with resilient column. 3,913,518, Cl. 116-63.0PC.

Karl Becker KG: *See—*
Becker, Reinhard, 3,913,503.

Karl Schmidt GmbH: *See—*
Diez, Adolf, 3,913,660.

Kartasuk, Raymond H., to Wilton Corporation. Dispensing carton for attachable package handles. 3,913,786, Cl. 221-70.000.

Kartridg Pak Co., The: *See—*
Keating, Raymond J.; Shuh, Lewis M.; and Wells, Roy E., 3,913,628.

Kashio, Toshio, to Casio Computer Co., Ltd. Ink jet type printing device. 3,914,772, Cl. 346-75.000.

Kashiwa, Shiroh: *See—*
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, 3,914,112.

Kashnow, Richard A., to General Electric Company. Quasi-homeotropic twisted nematic liquid crystal device. 3,914,022, Cl. 350-160.0LC.

Kasle Steel Corporation: *See—*
Morrison, James J., 3,913,166.

Kaslow, Walter. Brand name shopping guide. 3,913,249, Cl. 40-65.000.

Kaspers, Helmut: *See—*
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Katahira, Yukio; and Saito, Seiichi, to Nihon Beru-Haueru Kabushiki Kaisha. Tape take-up device. 3,913,868, Cl. 242-201.000.

Katayama, Tateo: *See—*
Matsui, Tokio; and Katayama, Tateo, 3,913,952.

Kato, Mikio, to Lawrence Peska Associates, Inc., a part interest. Headlight cleaner for vehicles. 3,913,840, Cl. 239-284.000.

Katsuta, Kihei, to Mitsubishi Jukogyo Kabushiki Kaisha. Low temperature liquid storage tank of the internal heat insulating type having leakage detecting means. 3,913,341, Cl. 62-49.000.

Katsutoshi, Kitagawa; Yoshiaki, Adachi; and Katsuyasu, Dono, to Toyota Jidosha Kogyo Kabushiki Kaisha. Sealing device for vane-type rotating machine. 3,914,076, Cl. 418-137.000.

Katsuyasu, Dono: *See—*
Katsutoshi, Kitagawa; Yoshiaki, Adachi; and Katsuyasu, Dono, 3,914,076.

Kaufman, Harold R.: *See—*
Reader, Paul D.; and Kaufman, Harold R., 3,913,320.

Kaufman, Irving, to United States of America, Air Force. System for adjusting individual sensors in an array. 3,914,597, Cl. 250-204.000.

Kavanagh, David Cecil: *See—*
Brooke, Peter Howard; Dickinson, Ian James; Kavanagh, David Cecil; and Smith, Colin, 3,914,118.

Kawabata, Hidetoshi: *See—*
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,914,046.

Kawabata, Takeshi: *See—*
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, 3,914,112.

Kawaguchi, Hiroshi: *See—*
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 3,914,736.

Kawahara, Atsushi; and Yamada, Koji, to Nippon Kogaku K.K. Image analyzer using a standard scanning or a multi-interlaced scanning type television system. 3,914,543, Cl. 178-6.800.

Kawahara, Ichizo, to Olympus Optical Co., Ltd. Guide tube for a treating instrument to be inserted into body cavity. 3,913,565, Cl. 128-2.00M.

Kawakatsu, Yasuyuki: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.

Kawamura, Naoto: *See—*
Tanabe, Akira; Tajima, Akira; and Kawamura, Naoto, 3,914,024.

Kawano, Yoichi: *See—*
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.

Kay Laboratories, Inc.: *See—*
Dandliker, Walter B., 3,913,559.

Kayamoto, Hisao: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.

Kayano, Tatsuo: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Keating, Raymond J.; Shuh, Lewis M.; and Wells, Roy E., to Kartridg Pak Co., The. Method and apparatus for hermetically sealing a package. 3,913,628, Cl. 140-82.000.

Keck, Jurgen, to Gebrueder Bellmer KG Maschinenfabrik. Folding device for box making machines. 3,913,465, Cl. 93-51.00R.

Keefe, George E.; Lin, Yeong S.; and Rosier, Laurence L., to International Business Machines, Corporation. Gapless multithickness propagation structure for magnetic domain devices. 3,914,751, Cl. 340-174.0TF.

Keimig, Russell Edward. Apparatus for dispensing metered quantity of liquid. 3,913,151, Cl. 4-224.000.

Keith, Paul S.: *See—*
Chia, Enrique; Hanegan, Herbert M.; and Keith, Paul S., 3,914,009.

Keller, Dieter; Kuhn, Rudolf; and Dotzauer, Willi, to Furstlich Hohenzollernsche Huttenverwaltung Laucherthal. Apparatus for threading closures onto bottles and similar containers. 3,913,301, Cl. 53-331.500.

Keller, Hans: *See—*
Forster, Gerhard; and Keller, Hans, 3,914,653.

Kellogg, Hudson W.: *See—*
Jones, John T.; Ludt, William C.; and Kellogg, Hudson W., 3,913,380.

Kellogg, Walter J.; and Taylor, Glenn R., to Westinghouse Electric Corporation. Switch operator with split cam. 3,914,571, Cl. 200-330.000.

Kelsey-Hayes Company: *See—*
Every, Peter; and Tribe, Leonard T., 3,913,984.
Thomas, J. Stanley L., 3,913,936.

Kelsoe, David C.: *See—*
Ivy, John B.; Willis, Gordon G.; and Kelsoe, David C., 3,914,167.

Kendall, David P., to United States of America, Army. Ultra-high pressure system with variable lateral anvil support. 3,914,078, Cl. 425-77.000.

Kendall, Ronald R.: *See—*
Probst, Richard O.; and Kendall, Ronald R., 3,913,523.

Kennedy, Carl D.: *See—*
Krehbiel, Delmar D.; Gregory, M. Duane; Clark, Charles R.; and Kennedy, Carl D., 3,913,674.

Kennedy, James H.; and Negstad, Robert D., to Ford Motor Company. Chassis construction for a motor vehicle. 3,913,696, Cl. 180-11.000.

Ker, Robert Alan Cameron; and Harrington, Colin John, to Burmah Oil Trading Limited. Hydraulic fluids. 3,914,182, Cl. 252-78.000.

Kessler, William D.: *See—*
Finlay, Alexander, Jr.; Dyer, Robert E.; and Kessler, William D., 3,914,757.

Ketchow, Doris Rahb, to Bell Telephone Laboratories, Incorporated. Germanium doped gaas layer as an ohmic contact. 3,914,785, Cl. 357-63.000.

Kieffer, Vernon E., to Emerson Electric Co. Interpole loop control device for coil winding machines. 3,913,629, Cl. 140-92.100.

Kiekhaefer Aeromarine: *See—*
Lohse, Lawrence L.; and Hackbarth, William E., 3,913,517.

Kilham, Peter, to Droll Yankees, Inc. Hummingbird feeder. 3,913,527, Cl. 119-51.00R.

Kim, Charles W.; and Liu, Chia-Seng, to Hercules Incorporated. Methods of making network structures. 3,914,365, Cl. 264-147.000.

Kim, Dong H., to American Home Products Corporation. 1,4-Diazepino[6,5,4-jk]carbazoles. 3,914,250, Cl. 260-315.000.

Kindig, Alan L., to General Electric Company. Method and apparatus for forming winding end turns. 3,913,373, Cl. 72-355.000.

Kinematics Limited: *See—*
Over, Charles Edward; and Scott, Milford Melvin, 3,913,322.

King, Josef: *See—*
Wolber, Robert; and King, Josef, 3,913,311.

King, Victor Howard George, to Barking Brassware Co. Limited. Mixer valves. 3,913,830, Cl. 236-12.00R.

Kipp, Kevin K.: *See—*
Oswitch, Stanley; Golownia, Robert F.; and Kipp, Kevin K., 3,914,200.

Kirby, William Everett; and Seymour, David Jackson, to Wharton Shipping Corporation. Vessel for flotation loading and unloading and partial buoyancy support of barges and other floating cargoes. 3,913,512, Cl. 114-43.500.

Kirk, Colin John, to Martonair Limited. Machine element position detection system. 3,914,754, Cl. 340-267.00R.

Kirsch, Francis William; Barmby, David S.; and Potts, John D., to Sun Research and Development Co. Dy zeolite hydrocarbon conversion catalyst. 3,914,383, Cl. 423-328.000.

Kishimoto, Soichiro: *See—*
Fukushima, Keitaro; Kishimoto, Soichiro; and Nosaka, Yoshinori, 3,914,394.

Kitakami, Hisashi: *See—*
Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, 3,914,579.

Kitchens, Garry C.: *See—*
Shaffer, Gary W.; Kitchens, Garry C.; and Kaiser, Kent, 3,914,314.

Kiwaki, Hisakatsu; Onoda, Yoshimitsu; and Ibamoto, Masahiko, to Hitachi, Ltd. Chopper control system. 3,914,672, Cl. 318-246.000.

Kleiner, Eduard Karl: *See—*
Dear, Robert Ernest Arthur; and Kleiner, Eduard Karl, 3,914,319.

Kleiner, Hans-Jerg; and Landauer, Franz, to Hoechst Aktiengesellschaft. Process for the manufacture of dialkyl-phosphinic acid esters. 3,914,345, Cl. 260-970.000.

Klensch, Richard Joseph, to RCA Corporation. Electronic identification system. 3,914,762, Cl. 343-6.5SS.

Klett, Robert D., to United States of America, Energy Research and Development Administration. High temperature insulating carbonaceous material. 3,914,392, Cl. 423-445.000.

Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, to Ceskoslovenska akademie ved. Hydrogel and method of manufacturing the same. 3,914,341, Cl. 260-885.000.

Klimpl, Fred. Pipe locking device. 3,913,954, Cl. 285-305.000.

Kline, Larry Harold: *See—*
Seals, Harold, 3,913,635.
Seals, Harold, 3,913,637.
Seals, Harold, 3,913,638.

Klomp, Antonius Maria, to U.S. Philips Corporation. Heart difibrillator with independently operating starting pulse generator. 3,913,588, Cl. 128-419.00D.

Klose, Karl-Heinz: *See—*
Burgdorf, Jochen; Klose, Karl-Heinz; and Storzel, Karl, 3,913,709.

Knapp, Julius Z.; and Hershberg, Emanuel B., to Schering Corporation. Method for inspecting liquids in transparent containers. 3,914,058, Cl. 356-197.000.

Knickerbocker Company, The: *See—*
Ramsey, Keith E., 3,913,765.

Knippel, Willis H.; and Marulic, Walter J., to Pullman Incorporated. Railway car door control mechanism. 3,913,267, Cl. 49-220.000.

Knittax: *See—*
Spencer, Dennis Lincoln, 3,913,353.

Knoblauch, Karl: *See—*
Juntgen, Harald; Knoblauch, Karl; Gappa, Gunther; and Schwarte, Jurgen, 3,913,253.

Knollman, Dieter John Henry, to Bell Telephone Laboratories, Incorporated. Universal PBX line circuit for key and non-key service. 3,914,559, Cl. 179-99.000.

Knoshaug, Wendell E.: *See—*
Pitt, Harold M.; Zeleny, Richard A.; and Knoshaug, Wendell E., 3,914,346.

Knott, Martin J.; Lewis, Lloyd G.; and Rabe, Herbert H., to United States of America, Energy Research & Development Administration. Ring magnet firing angle control. 3,914,681, Cl. 321-40.000.

Kobale, Manfred: *See—*
Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, 3,913,224.

Kobayashi, Toshihiro: *See—*
Kano, Saburo; Sasaki, Tatsuo; and Kobayashi, Toshihiro, 3,914,098.

Kobe Steel, Ltd.: *See—*
Ikegami, Yoshio, 3,913,858.

Kober, Harald, to G. Siempelkamp & Co. Apparatus for producing boards of filamentary material. 3,914,079, Cl. 425-80.000.

Koch, Hans: *See—*
von Jordan, Wenzel; Barth, Hans-Jorg; Koch, Hans; and Boning, Gunter, 3,914,387.

Koch, James Allan; Nelson, Roger John; and Henderson, Donald LeRoy, to Deere & Company. Position-responsive hydraulic cylinder. 3,913,449, Cl. 91-368.000.

Koch, Robert B., to Rilsan Corporation. Polyester hose and preparation thereof. 3,914,146, Cl. 156-149.000.

Koehler, Harold; Zundel, Weldon P.; and Rickard, Robert S., to AMAX Inc. Removal of residual copper from nickel solutions. 3,914,374, Cl. 423-25.000.

Koehn, Franklin E.; Esau, Robert N.; and Jantz, Le Vern D. Variable width highway trailer. 3,913,934, Cl. 280-34.00A.

Koelzer, Terry R.: *See—*
Sale, Dwight B.; and Koelzer, Terry R., 3,913,419.

Koenig & Bauer Aktiengesellschaft: *See—*
Dauner, Bertram Wilhelm-Georg; Marx, Helmut Hermann; and Wolfram, Karl-Heinz Arno, 3,913,480.

Koenigs, Joseph F.: *See—*
Driskell, Thomas D.; Heller, Alfred L.; and Koenigs, Joseph F., 3,913,229.

Kohen, Isak. Parking space barrier. 3,913,264, Cl. 49-49.000.

Kohler, Fritz; and Perotti, Andre, to Edouard Dubied et Cie (Societe Anonyme). Design knitting machine with stitch transfer. 3,913,354, Cl. 66-75.000.

Kohlhammer, Walter: *See—*
Schmickl, Helfried; and Kohlhammer, Walter, 3,914,666.

Kohn, Gustave K., administrator: *See—*
Brown, Melancthon S., deceased; and Kohn, Gustave K., administrator, 3,914,259.

Kokoras, John N.; and Kokoras, William N. Abrasive cylinder for hide treating machines. 3,913,278, Cl. 51-206.00P.

Kokoras, William N.: *See—*
Kokoras, John N.; and Kokoras, William N., 3,913,278.

Kolensky, Leo Michael: *See—*
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, 3,914,743.

Komatsu, Akira: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,914,289.

Komine, Yoshio, to Canon Kabushiki Kaisha. Camera system, especially motion picture camera system with interchangeable lenses. 3,914,034, Cl. 352-142.000.

Komyoji, Terumasa: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Shigehara, Itaru; and Komyoji, Terumasa, 3,914,240.

Kondo, Hisao: *See—*
Miyake, Akihisa; Kondo, Hisao; Nishidoi, Takashi; and Onnagawa, Osamu, 3,914,315.

Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, to Nippon Hoso Kyokai. Microwave circuits constructed inside a waveguide. 3,914,713, Cl. 333-21.00R.

Konnai, Makoto; Kamata, Hiroshi; and Kado, Masaru, to Kumiai Chemical Industry Co., Ltd. S-(4-Chlorobenzyl)-N,N-Diethylthiolcarbamate. 3,914,270, Cl. 260-455.00A.

Konno, Kenichi: *See—*
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 3,914,713.

Konort, Mark D.: *See—*
Lamberti, Vincent; Konort, Mark D.; and Weil, Ira, 3,914,297.

Konrad, Charles Edward, to General Electric Company. Fault detector circuit for electric vehicle control. 3,914,675, Cl. 318-453.000.

Koontz, Carl E.: *See—*
Acton, Daniel D.; and Koontz, Carl E., 3,913,771.

Koplow, Harold Stanley; Eberle, Fritz; Ho, Shu-Kuang; and Lesnick, Edward, to Wang Laboratories, Inc. Single tape editing. 3,913,721, Cl. 197-19.000.

Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(cyano-phenoxy)-2-hydroxy-3-alkylamino-propane and method of use. 3,914,432, Cl. 424-304.000.

Koppers Company, Inc.: *See—*
Gidick, Ward F., 3,914,159.
Watts, Ralph E., 3,913,499.

Koral, Ephraim. Movable floor for the deck of a truck. 3,913,760, Cl. 214-83.360.

Kornylak, Andrew T., to Kornylak Corporation. Continuous molding machine. 3,914,084, Cl. 425-329.000.

Kornylak Corporation: *See—*
Kornylak, Andrew T., 3,914,084.

Kors, David L.; Lawver, Billy R.; and Addoms, John F., to Aerojet-General Corporation. Platelet-injector venturi carburetor for internal combustion engines. 3,914,347, Cl. 261-23.00A.

Kors, David L.; Addoms, John F.; and Lawver, Billy R., to Aerojet-General Corporation. Platelet-venturi carburetor for combustion engine. 3,914,348, Cl. 261-23.00A.

Korzekwa, Samuel M.: *See—*
Hesler, Joseph P.; and Korzekwa, Samuel M., 3,914,680.

Kosonocky, Stephan; and Post, Lloyd D., to United States of America, Army. Automatic delay graze sensitive fuze. 3,913,486, Cl. 102-75.000.

Kosson, Robert L.: *See—*
Roukis, John G.; Kosson, Robert L.; and Westell, John R., 3,913,664.

Kossor, Albert A. Tape cassette index system. 3,913,200, Cl. 29-169.500.

Kostecki, John Albert: *See—*
Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, 3,914,302.

Kostjunin, Boris Nikolaevich; Zadvorny, Alfred Fedorovich; Ragutsky, Arnold Mikhailovich; and Starichnev, Vladimir Viktorovich. Safety valve. 3,913,613, Cl. 137-494.000.

Kowalski, Xavier, to Monsanto Company. Compositions and process for the electrodeposition of metals. 3,914,162, Cl. 204-46.00G.

Kozasu, Isao; and Shimizu, Teruhiko, to Nippon Kokan Kabushiki Kaisha. Method of improving steel properties by using controlled cooling rates. 3,914,135, Cl. 148-144.000.

Kramer, Willi; and Schanzer, Hans-Peter, to Daimler-Benz Aktiengesellschaft. Air distributor. 3,913,468, Cl. 98-2.150.

Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst; and Scheinpflug, Hans, to Bayer Aktiengesellschaft. Combating fungi with 1-ethylimidazoles. 3,914,427, Cl. 424-273.000.

Kratky, Helmut, to Gertsch AG. Ski binding element. 3,913,931, Cl. 280-11.35R.

Krause, Anthony Victor DeVere. Method of assembling cathode ray tubes. 3,913,194, Cl. 29-25.160.

Krauss-Maffei AG: *See—*
Hanslik, Wilhelm, 3,913,897.

Krehbiel, Delmar D.; Gregory, M. Duane; Clark, Charles R.; and Kennedy, Carl D., to Continental Oil Company. Waterflooding method using overbased sulfonate. 3,913,674, Cl. 166-270.000.

Kressel, Henry, to RCA Corporation. Method of making a transmission photocathode device. 3,914,136, Cl. 148-171.000.

Kreula, Matti Siimoni; and Moisio, Tauno Vihtori, to Valio Meijerien Keskusosuusliike. Method and apparatus for testing the contents of packages containing liquid products. 3,913,383, Cl. 73-52.000.

Krieg, Manfred; Suetterlin, Norbert; and Blitz, Hans-Dieter, to Rohm GmbH. Opalescent methylmethacrylate polymer bodies. 3,914,338, Cl. 260-876.00R.

Kroenke, William J., to B. F. Goodrich Company, The. Flame and smoke retardant vinyl chloride and vinylidene chloride polymer compositions. 3,914,201, Cl. 260-45.75R.

Kronman, Seymour: *See—*
Dunetz, Bryant R.; and Kronman, Seymour, 3,913,488.

Krosnar, Thomas Charles: *See—*
Gasson, Edward James; Marrian, Stanley Frederic; and Krosnar, Thomas Charles, 3,914,278.

Kruelskie, Donald A., to Dow Chemical Company, The. Extrusion apparatus. 3,914,085, Cl. 425-380.000.

Kruisman, Gerard: *See—*
Versluis, Jan; Rutten, Hendrikus S.; and Kruisman, Gerard, 3,913,157.

Kruse, Werner. Method and machine for rolling threads or the like. 3,913,365, Cl. 72-104.000.

Krusius Brothers: *See—*
Weber, Dietrich, 3,913,422.

Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, to Hitachi, Ltd. Method for reducing nitrogen oxides. 3,914,390, Cl. 423-351.000.

Kugler, Jorg: *See—*
Berner, Klaus; Kugler, Jorg; and Grote, Hans-Gunther, 3,913,388.

Kuhar, Paul W.: *See—*
Holloway, Thomas M.; Janu, George J.; Kuhar, Paul W.; and Laakaniemi, Richard N., 3,913,344.

Kuhla, Donald E.: *See—*
Evanega, George R.; Kuhla, Donald E.; and Sarges, Reinhard, 3,914,426.

Kuhle, Engelbert: *See—*
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Kuhn, Ernst: *See—*
Miller, Hermann; and Kuhn, Ernst, 3,914,060.

Kuhn, Franz-Josef: *See—*
Bauer, Adolf; Weber, Karl-Heinz; Danneberg, Peter; and Kuhn, Franz-Josef, 3,914,216.

Kuhn, Rudolf: *See—*
Keller, Dieter; Kuhn, Rudolf; and Dotzauer, Willi, 3,913,301.

Kuhnis, Hans; Egli, Christian; Eichenberger, Kurt; and Hedwall, Phyllis Roberta, to Ciba Geigy Corporation. Certain 5-lower-alkyl-pyridine-2-carboxylates. 3,914,239, Cl. 260-295.00R.

Kulite Semiconductor Products, Inc.: *See—*
Kurtz, Anthony D., 3,913,391.

Kulke, Gunter: *See—*
Ziesche, Kurt; and Kulke, Gunter, 3,913,537.

Kumagai, Gentaro, to Gentaro Kumagai. Interlocking device of doors. 3,913,270, Cl. 49-360.000.

Kumiai Chemical Industry Co., Ltd.: *See—*
Konnai, Makoto; Kamata, Hiroshi; and Kado, Masaru, 3,914,270.

Kummer, Werner: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, 3,914,432.

Kumobayashi, Hidenori: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,914,289.

Kunstmann, Martin Paul: *See—*
McGahren, William James; and Kunstmann, Martin Paul, 3,914,409.

Kunz, Otto; Hartmann, Rainer; and Nicolay, Johann, to Metallgesellschaft Aktiengesellschaft. Apparatus for the separation of difficulty miscible or non-miscible liquids. 3,914,175, Cl. 210-73.000.

Kupsky, George A., to Burroughs Corporation. Multi-segment display panel with anode groups. 3,914,643, Cl. 313-519.000.

Kurahashi, Keizo: *See—*
Murase, Kenji; Ishizaki, Hiroyuki; and Kurahashi, Keizo, 3,914,761.

Kuraray Co., Ltd.: *See—*
Kanehira, Hiroshi; and Kurosaki, Syozi, 3,914,497.

Kurata, Hirotaka, to Sansui Electric Co., Ltd. Tone control circuit. 3,914,716, Cl. 333-28.00T.

Kurosaki, Syozi: *See—*
Kanehira, Hiroshi; and Kurosaki, Syozi, 3,914,497.

Kurose, Yukiteru; and Shimizudani, Noriroo, to Victaulic Co. of Japan, The. Leakage test apparatus for tubular bodies. 3,913,382, Cl. 73-46.000.

Kurtz, Anthony D., to Kulite Semiconductor Products, Inc. Strain gage configurations employing high di-electric strength and efficient strain transmission. 3,913,391, Cl. 73-88.50R.

Kurtz, Donald R.: *See—*
Crouch, Donald W.; Kurtz, Donald R.; and Sofianek, Joseph C., 3,914,568.

Kurze, Joachim: *See—*
Jorek, Helmut; Fikentscher, Rolf; Kurze, Joachim; and Helfert, Herbert, 3,914,496.

Kushner, Benjamin: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; and Kushner, Benjamin, 3,913,816.

Kuwamoto, Hiroshi: *See—*
Fujii, Seiji; Kamata, Masamoto; Ishida, Masayuki; and Kuwamoto, Hiroshi, 3,913,363.

Laakaniemi, Richard N.: *See—*
Holloway, Thomas M.; Janu, George J.; Kuhar, Paul W.; and Laakaniemi, Richard N., 3,913,344.

Laapas, Heikki Reino. Flotation of oxide minerals in hot pulp. 3,913,742, Cl. 209-11.000.

Laauwe, Robert H. Aerosol valve actuator with front end discharge governor. 3,913,803, Cl. 222-402.110.

Laauwe, Robert H. Aerosol valve actuator. 3,913,804, Cl. 222-402.110.

Labana, Santokh S.; and Theodore, Ares N., to Ford Motor Company. Powder coating compositions comprising a blend of coreactive polymers - II. 3,914,333, Cl. 260-836.000.

La Bate, James B. Tool for inserting devices holding side boards in ingot molds. 3,913,205, Cl. 29-278.000.

LaBrecque, Raymond E.: *See—*
Nehra, Samuel A.; Saad, Oscar C.; and LaBrecque, Raymond E., 3,913,577.

La Brie, Jack A.: *See—*
Ray, Clarence R.; and La Brie, Jack A., 3,913,186.

Lacey, Robert L., to Illinois Tool Works Inc. Biopsy tool and method. 3,913,566, Cl. 128-2.00B.

Lage, David P.: *See—*
Goessling, John G.; and Lage, David P., 3,913,362.

Lagsdin, Andry: *See—*
MacKenzie, Robert A.; and Lagsdin, Andry, 3,913,942.

Lale, Walter G.; and Reinmiller, Elmer E. Fluid-metering apparatus. 3,913,807, Cl. 222-442.000.

Lalikos, James M.: *See—*
Gazda, Chester T.; and Lalikos, James M., 3,913,625.

Lambert, Arthur Harold. Cutting machine for friction material. 3,913,431, Cl. 83-100.000.

Lambert Corporation: *See—*
Ruhl, Walter Franklin, 3,913,247.

Lambert, Robert D., to Multiply Development Corporation, Ltd. Apparatus for producing wafers from wood. 3,913,643, Cl. 144-172.000.

Lamberti, Vincent; Konort, Mark D.; and Weil, Ira, to Lever Brothers Company. Carboxy methyloxy succinates. 3,914,297, Cl. 260-535.00P.

Lamden, Sidney K.: *See—*
Holden, Homer N.; Shokler, Morris; and Lamden, Sidney K., 3,913,622.

Lancini, Giancarlo: *See—*
Pagani, Hermes; Coronelli, Carolina; Bardone, Maria Rosa; and Lancini, Giancarlo, 3,914,257.

Landauer, Franz: *See—*
Kleiner, Hans-Jerg; and Landauer, Franz, 3,914,345.

Landers, Harry M.: *See—*
Hanson, David E.; and Landers, Harry M., 3,913,604.

Landry, Ronald J. Waste oil burner. 3,914,094, Cl. 431-202.000.

Lang, John L. Process for the preparation of a fly fishing line and the resulting article. 3,914,480, Cl. 428-395.000.

Langer, Horst G., to Dow Chemical Company, The. Dentifrices and method for reducing enamel solubility. 3,914,404, Cl. 424-48.000.

Lanham, Robert L.: *See—*
Brownlee, Milton A.; and Lanham, Robert L., 3,913,825.

Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., to Chase Corporation. Fire retardant insulating tape wrap. 3,914,495, Cl. 428-255.000.

Lankenau, Arthur W.; and Scott, Harry B. Relatively hard unattached objects to inhibit caking and scaling in a horizontal pipeline. 3,913,890, Cl. 259-3.000.

Lansing Research Corporation: *See—*
Wolga, George J.; and McFarlane, Ross A., 3,914,055.

Lapple, Egon; and Schmidt, Peter, to Robert Bosch GmbH. Fuel injection system for an internal combustion engine. 3,913,536, Cl. 123-32.0EA.

Large, Arthur. Portable sawmill. 3,913,439, Cl. 83-707.000.

Laribe, Armand, to Freitag, Jean, a part interest. Motor vehicle headlights. 3,914,593, Cl. 240-41.35R.

Larime, Carl M., to General Signal Corporation. Electromagnetic door holder. 3,913,958, Cl. 292-251.500.

Larkin, Oscar L., to Allis-Chalmers Corporation. Flange clamp for an insulating weatherproof enclosure. 3,913,959, Cl. 292-256.600.

Larsen, Ronald Leslie, to Conwed Corporation. Tufted carpets with elastomeric net backing. 3,913,510, Cl. 112-410.000.

Larson, Rodney L., to MTS Systems Corporation. Overturning moment compensation in a multiple actuator control of a rigid table. 3,913,389, Cl. 73-71.600.

Laser Industries Ltd.: *See—*
Sharon, Uzi, 3,913,582.

Latawic, Stephen H. Fluid reaction device having an undulatory flexible wall. 3,913,461, Cl. 92-89.000.

Lawes, Harlan D.: *See—*
Guzman, Adolfo M.; and Lawes, Harlan D., 3,914,631.

Lawrence Peska Associates, Inc.: *See—*
Arnold, Kenneth E.; and Arnold, Joyce P., 3,913,243.
Carmen, Kenneth, 3,913,915.
Castillo, Manuel, 3,913,424.
Kato, Mikio, 3,913,840.
Thomas, Edward, 3,913,159.

Lawrenz, Carl F.: *See—*
Strauss, Robert F.; and Lawrenz, Carl F., 3,913,979.

Lawver, Billy R.: *See—*
Kors, David L.; Lawver, Billy R.; and Addoms, John F., 3,914,347.
Kors, David L.; Addoms, John F.; and Lawver, Billy R., 3,914,348.

Laybourn, Robert Junior: *See—*
Bowdle, Raymond Ralph; and Laybourn, Robert Junior, 3,913,722.

Lazarre, Flavien; Blu, Gilbert; and Rozand, Jacques, to Societe Nationale Des Petroles D'Aquitaine. Submerged combustion installation. 3,913,560, Cl. 126-360.00R.

Lear Siegler, Inc.: *See—*
Maday, Arthur E., 3,913,196.

Lechler, Siegfried: *See—*
Blount, Floyd E.; Becker, Reinhard F.; Lechler, Siegfried; and Ockelmann, Helmut, 3,913,678.

Lee, Chi-Long; and Schulz, Jay R., to Dow Corning Corporation. Acetoxysilicon adhesion promoter and primer composition. 3,914,199, Cl. 260-32.8SB.

Lee Inventions, Inc.: *See—*
Lee, William Smith, 3,913,763.

Lee, Richard J., to Standard Oil Company. Oil-soluble reaction products of (a) a high molecular weight olefin polymer, acrylonitrile, chlorine, an amine and maleic anhydride with (b) an aliphatic amine; and lubricant compositions containing the same. 3,914,203, Cl. 260-78.40D.

Lee, William Smith, to Lee Inventions, Inc. Collapsible dolly moving system. 3,913,763, Cl. 214-505.000.

Leeds & Northrup Company: *See—*
Arcara, Samuel A., 3,913,403.

Leedy, Hayden M.: *See—*
Stover, Harry L.; and Leedy, Hayden M., 3,914,708.

Leesona Corporation: *See—*
Nelson, John, 3,913,743.

LeFebvre, Clarence A., Jr., to United Technologies Corporation. Universal joint employing a fluid bearing. 3,913,951, Cl. 285-223.000.

Leidich, Arthur John, to RCA Corporation. Current proportioning circuit. 3,914,684, Cl. 323-4.000.

Leigh, Richard Eugene, Jr. Feeding pen for haystacks. 3,913,529,'Cl. 119-60.000.

Leimgruber, Willy: *See—*
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,232.
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,233.
Mohacsi, Ernest; and Leimgruber, Willy, 3,914,234.

Leiter, Robert: *See—*
Jardin, Hans; Leiter, Robert; and Lutz, Alfons, 3,913,970.

Lemaire, Paul, to Filature de Saint Andre. Method and apparatus for the manufacture of fancy yarns. 3,913,308, Cl. 57-18.000.

Lenk, Erich; Turk, Herbert; and Schiminski, Herbert, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Winding apparatus and process. 3,913,852, Cl. 242-18.00A.

Lenoe, Edward: *See—*
Finelli, Thomas M.; Lenoe, Edward; and McAllister, Lawrence E., 3,914,395.

Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, to Boehringer Mannheim GmbH. 3-Alkyl-4-sulfamoyl-aniline compounds. 3,914,219, Cl. 260-239.600.

Lerch, Ulrich; and Granzer, Ernold, to Hoechst Aktiengeseilschaft. 1-(Imidazole-1-yl)-isoquinolines and process for preparing them. 3,914,236, Cl. 260-288.0CE.

Les Cables de Lyon: *See—*
Bendayan, Jacques, 3,914,533.

Leslie Metal Arts Company, Inc.: *See—*
Vander Ley, Robert J., 3,913,998.

Lesnick, Edward: *See—*
Koplow, Harold Stanley; Eberle, Fritz; Ho, Shu-Kuang; and Lesnick, Edward, 3,913,721.

Lester, Fritz O., to Lester, Liane E. Seat construction. 3,913,978, Cl. 297-445.000.

Lester, Liane E.: *See—*
Lester, Fritz O., 3,913,978.

Leto, Anthony, to Curtiss-Wright Corporation. Turbine engine and rotor mounting means. 3,914,067, Cl. 415-212.000.

Leuschner, Horst, to Texas Instruments Incorporated. Electronic selector system. 3,914,698, Cl. 328-105.000.

Leutwyler, Roy: *See—*
Jureit, John Calvin; Leutwyler, Roy; Brodsky, Larry; and Kushner, Benjamin, 3,913,816.

Lev, Yaacov, to Shell Oil Company. Cold spot detector for lng tanks and tankers. 3,914,688, Cl. 324-71.00R.

Lever Brothers Company: *See—*
Finney, David John; Ravenhill, John Richard; and Tait, Malcolm John, 3,914,441.
Jones, Norman, 3,914,459.
Lamberti, Vincent; Konort, Mark D.; and Weil, Ira, 3,914,297.

Lewis, Benjamin Stanley, to Wiggins Teape Research & Development. Capsule-carrying sheets or webs. 3,914,470, Cl. 427-202.000.

Lewis, Geoffrey Arthur, to Joseph Lucas (Industries) Limited. Fuel control apparatus for gas turbine engines. 3,913,317, Cl. 60-39.28R.

Lewis, Howard M.: *See—*
Martin, James C.; Meen, Ronald H.; and Lewis, Howard M., 3,914,229.

Lewis, Lloyd G.: *See—*
Knott, Martin J.; Lewis, Lloyd G.; and Rabe, Herbert H., 3,914,681.

Lewis, Michael, to Flinchbaugh Products, Inc. Multi-container trash compactor. 3,913,474, Cl. 100-45.000.

Lewis, Sheldon N.: *See—*
Miller, George A.; Lewis, Sheldon N.; and Weiler, Ernest D., 3,914,301.

Liberity Carton Service: *See—*
Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., 3,913,827.

Licentia Patent-Verwaltungs: *See—*
Kaiser, Reinhold, 3,913,214.

Lichtblau, George Jay. Planar circuit fabrication process. 3,913,219, Cl. 29-592.000.

Li Donnici, Kenneth, to Educational & Commercial Avcom Inc. Multiple lamp unit for protection. 3,914,645, Cl. 315-89.000.

Life Support, Inc.: *See—*
Thompson, Tommy Lewis, 3,914,355.

Light, Glenn M. Adhesive and tape dispensing device. 3,913,522, Cl. 118-419.000.

Liguori, Stephen A. Method and apparatus for providing a stationary film record having sequentially displayable images. 3,914,038, Cl. 353-89.000.

Liimatta, David R.: *See—*
Haase, Lawrence H.; and Liimatta, David R., 3,913,545.

Lin, Tenhon. Paper product foldable manually to form a non-leaking container. 3,913,823, Cl. 229-31.0FS.

Lin, Yeong S.: *See—*
Keefe, George E.; Lin, Yeong S.; and Rosier, Laurence L., 3,914,751.

Lincoln Farm Equipment Company: *See—*
Lincoln, William D.; and Lincoln, William W., 3,913,681.

Lincoln, William D.; and Lincoln, William W., to Lincoln Farm Equipment Company. Outrigged rotating cultivator. 3,913,681, Cl. 172-5.000.

Lincoln, William W.: *See—*
Lincoln, William D.; and Lincoln, William W., 3,913,681.

Lindeman, Myrl A., to Sun Oil Company of Pennsylvania. Friction testing machine for lubricants. 3,913,377, Cl. 73-10.000.

Lindl, Willibald M.: *See—*
Valentas, Kenneth J.; and Lindl, Willibald M., 3,914,455.

Lindner, Ernst: *See—*
Stache, Ulrich; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, 3,914,213.

Lindner, Heinz, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Arrangement of elements in a knitting machine. 3,913,355, Cl. 66-84.00R.

Lindsay, Richard P.: *See—*
Hahn, Robert S.; and Lindsay, Richard P., 3,913,277.

Lingeri, Antonio: *See—*
Maquignaz, Mario; Benedetto, Bruno; and Lingeri, Antonio, 3,913,476.

Linsky, Mark S.: *See—*
Holden, Thomas E.; and Linsky, Mark S., 3,914,658.

Lions, Noel: *See—*
Hanff, Michel; Lions, Noel; and Peronnet, Jean, 3,913,407.

Lipani, Anthony Frank: *See—*
Berg, Allen Clark; Fargensi, Rudolph; and Lipani, Anthony Frank, 3,914,181.

Lipha, Lyonnaise Industrielle Pharmaceutique: *See—*
Szarvasi, Etienne; and Fontaine, Louis, 3,914,379.

Liscia, Aldo: *See—*
Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., 3,913,208.

Litt, Stuart P.; Zeltser, Melvin J.; Giannini, Richard J.; and Frazita, Richard F., to Hazeltine Corporation. Simplified doppler antenna system. 3,914,765, Cl. 343-106.00D.

Littelfuse, Inc.: *See—*
Williamson, Harold L., 3,914,725.

Litton Systems, Inc.: *See—*
Eggington, Wilfred James, 3,913,704.

Liu, Chia-Seng: *See—*
Kim, Charles W.; and Liu, Chia-Seng, 3,914,365.

Ljung, Bo H. G.; and Stiles, John C., to Singer Company, The. Angular direction sensor. 3,913,405, Cl. 73-505.000.

Lloyd, Brian Edwin; and Marsh, Barry John, to GKN Group Services Limited. Production of bodies from synthetic plastics material. 3,914,370, Cl. 264-297.000.

Lloyd, James R.: *See—*
Todd, William W.; Ilfrey, William T.; and Lloyd, James R., 3,913,668.

Lloyd, Wayne B.; Logan, Dale R.; and Tang, Yu-Sun, to Westinghouse Electric Corporation. Heat removal apparatus for dynamoelectric machines. 3,914,630, Cl. 310-61.000.

Lock, Everett H.: *See—*
Howard, Willis W.; Maurer, William C.; and Lock, Everett H., 3,914,752.

Lockard, Joseph Larue, to AMP Incorporated. Alternate make and break type operating means for pushbutton switch assemblies. 3,914,570, Cl. 200-153.00J.

Lockheed Aircraft Corporation: *See—*
Wirt, Leslie S.; and Morrow, Duane L., 3,913,702.

Lockheed Electronics Company, Inc.: *See—*
Hankins, Frederick E., 3,913,866.

Lodes, Ralph R. Apparatus for forming curvilinear resinous building structures. 3,914,077, Cl. 425-60.000.

Loeffler, Norman Raymond, to Dow Chemical Company, The. Polymeric pigments and method for preparation thereof. 3,914,196, Cl. 260-29.70H.

Loewe-Optal GmbH: *See—*
Allner, Olaf, 3,914,700.

Logan, Benjamin Franklin, Jr., to Bell Telephone Laboratories, Incorporated. Analog electronic multiplier. 3,914,591, Cl. 235-194.000.

Logan, Dale R.: *See—*
Lloyd, Wayne B.; Logan, Dale R.; and Tang, Yu-Sun, 3,914,630.

Logan, Forrest E., to Occidental Petroleum Corporation. Intercompartment seal for rotary feeder. 3,913,800, Cl. 222-368.000.

Logue, Joseph C., to International Business Machines Corporation. Accurate and stable encoding with low cost circuit elements. 3,914,760, Cl. 340-347.0AD.

Logue, Robert W.: *See—*
Olsson, Nils O.; and Logue, Robert W., 3,913,683.

Lohr-Construction de Vehicules Industriels S.A.: *See—*
Lohr, Robert, 3,913,496.

Lohr, Robert, to Lohr-Construction de Vehicules Industriels S.A. Road-transport vehicle-carrier. 3,913,496, Cl. 105-368.00R.

Lohr, Thomas Herbert; and Scholten, Stephen Clair, to Deere & Company. Snowmobile suspension spring adjustment. 3,913,692, Cl. 180-5.00R.

Lohse, Lawrence L.; and Hackbarth, William E., to Kiekhaefer Aeromarine. Hydraulic steering mechanism for marine drive. 3,913,517, Cl. 115-35.000.

Lonati, Francesco, to Costruzioni Meccaniche Lonati di Lonati Francesco & Figli (Ettore, Fausto, Tiberio) S.n.c. Dial operated stocking toe closer. 3,913,357, Cl. 66-95.000.

Long, William C.: *See—*
Hoover, Michael C.; and Long, William C., 3,914,601.

Longstaff, Kenneth: *See—*
Johnson, Frederick Stanley; and Longstaff, Kenneth, 3,914,665.

Longworth, William F.; and Tamas, Attila J., to Dura Corporation. Universal axle pad and clamp assemblies for vehicle suspensions. 3,913,937, Cl. 280-104.50A.

Lonza, Ltd.: *See—*
Greth, Erich, 3,914,281.

Loomba, Yogendra Singh: *See—*
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,861.
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,862.

L'Oreal: *See—*
Morane, Bruno P.; and Alexandre, Pierre, 3,913,592.

Lorenz, Walter; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-alkyl-o-[7-substitutedbenzisoxazol(3)yl]-(thiono)-phosphoric (phosphonic) acid esters. 3,914,243, Cl. 260-307.00D.

Loughborough University of Technology, The: *See—*
Priestley, Terence Patrick; and Garside, John Duncan, 3,913,448.

Louis A. Grant, Inc.: *See—*
Barron, George E.; and Pavone, Harry, 3,913,756.

Lovato, Antonio R.; and Lovato, Victoria C. Citrus cutter. 3,913,226, Cl. 30-123.500.

Lovato, Victoria C.: *See—*
Lovato, Antonio R.; and Lovato, Victoria C., 3,913,226.

Loveland Industries, Inc.: *See—*
Mommer, Richard Paul, 3,913,555.

Lovey, George Leslie, to Otis Elevator Company. Control system for load carrier and associated transfer apparatus. 3,913,757, Cl. 214-38.0BA.

Lovgren, Kjell Ake Vilhelm, to Aktiebolaget Electrolux. Multi-purpose vacuum cleaner nozzle. 3,913,168, Cl. 15-319.000.

Low, III: John Lewis: *See—*
Archer, Bill; and Low, III: John Lewis, 3,913,953.

Loy, Fritz, to Kabel-und Metallwerke Gutehoffnungshutte AG. Spark plug socket for internal combustion engines. 3,914,003, Cl. 339-26.000.

Lubowitz, Hyman R.; and Raech, Harry, Jr., to TRW Inc. Flexible electrical insulating polymeric sheet. 3,914,334, Cl. 260-836.000.

Lucas Electrical Company Ltd., The: *See—*
Wentworth, Philip Rossell; and Jeyes, John Anthony, 3,913,547.

Lucasey, Joseph A.; and Boscacci, William L. Support stand for an appliance. 3,913,880, Cl. 248-415.000.

Luce, Robert L.: *See—*
Seeds, Robert B.; and Luce, Robert L., 3,913,211.

Lucke, Robert James, Jr.: *See—*
Miller, Wayne Russel; and Lucke, Robert James, Jr., 3,913,324.

Lucki, Stanley J.; Chen, Nai Yuen; and Bowes, Emerson, to Mobil Oil Corporation. Disproportionation of aliphatic compounds. 3,914,331, Cl. 260-676.00R.

Ludt, William C.: *See—*
Jones, John T.; Ludt, William C.; and Kellogg, Hudson W., 3,913,380.

Lukeman, John R. Apparatus and system for gaining access to conflagrations. 3,913,964, Cl. 294-64.00R.

Lumoprint Sindler KG: *See—*
Opravil, Egon, 3,914,041.

Lunde, George G.; and Opseth, Stan J., to Minnesota Mining & Manufacturing Company. Electrographic recording process and apparatus employing synchronized recording pulses. 3,914,771, Cl. 346-74.0ES.

Lundgren, Helga Katarina: *See—*
Johansson, Haldor Ingemar; Lundgren, Helga Katarina; and Joustra, Marius Klaus, 3,914,183.

Lunkenheimer Company, The: *See—*
Paptzun, George J., 3,913,610.

Lunn, Howard Cervase: *See—*
Desty, Denis Henry; and Lunn, Howard Cervase, 3,914,089.

Lunquist, Frank C.: *See—*
Vogelgesang, Peter J.; and Lunquist, Frank C., 3,914,775.

Luppens, Patrick M., to Schoolcraft, Robert B. Collapsible camper. 3,913,968, Cl. 296-23.00R.

Lutz, Alfons: *See—*
Jardin, Hans; Leiter, Robert; and Lutz, Alfons, 3,913,970.

Lybrand, Robert A.: *See—*
Ward, John W.; and Lybrand, Robert A., 3,914,433.

Lynott, John Joseph: *See—*
Coker, Charles Walter, Jr.; Hickox, Thomas A.; Lynott, John Joseph; and O'Rourke, Thomas Frank, 3,914,789.

M. W. Bevins Co., Inc.: *See—*
Bevins, Marvin W., 3,914,687.

M & W Gear Company: *See—*
Fackler, Kenneth C.; and Bradford, John O., 3,913,242.

MacGregor, Robert, to Dreis & Krump Manufacturing Co. Hydraulic Control system for press brakes or the like. 3,913,450, Cl. 91-390.000.

MacKenzie, George D.; and Noblett, Michael G., to TRW, Inc. Termination for resistor and method of making the same. 3,914,514, Cl. 428-426.000.

MacKenzie, Robert A.; and Lagsdin, Andry. Stabilizer pad for earth-moving apparatus. 3,913,942, Cl. 280-150.500.

MacWade, Robert W.; and McDevitt, Bernard J., to Sperry Rand Corporation. Precision motion control device or the like. 3,914,677, Cl. 318-561.000.

Maday, Arthur E., to Lear Siegler, Inc. Rotary cutting tool. 3,913,196, Cl. 29-103.00A.

Madden, James F.; and Scott, Gordon C., to Mine Safety Appliances Company. Surgical splint assembly. 3,913,570, Cl. 128-87.00R.

Madonian, Vahe Samuel; and Douglas, Joseph Daniel, to International Telephone and Telegraph Corporation. Position controller. 3,914,676, Cl. 318-467.000.

Maeda, Koshi. Correcting measure device for cephalometry. 3,913,561, Cl. 128-2.00A.

Maelstaf, Serge Marcel Yves; and Altesleben, Jacques Joseph Antoine, to International Standard Electric Corporation. Horizontal crossbar multiswitch control device. 3,914,724, Cl. 335-112.000.

Magee, Philip S., to Chevron Research Company. Insectidical N-hydrocarboyl phosphoroamidothioates and phosphoroamidodithioates. 3,914,417, Cl. 424-219.000.

Mages, Bernhard: *See—*
Rock, Erich; and Mages, Bernhard, 3,913,173.

Magester, Earl H., to General Electric Company. Refrigerant system connecting apparatus. 3,913,348, Cl. 62-298.000.

Maggioni, Paolo, to Brichima S.p.A. Process for preparing diphenols. 3,914,323, Cl. 260-621.00G.

Maggioni, Paolo, to Bnchima S.p.A. Process for the preparation of diphenols. 3,914,324, Cl. 260-621.00G.

Magicam Inc.: *See—*
Slater, Dan, 3,914,540.

Magnasync Moviola Corporation: *See—*
Matthews, George, 3,913,433.

Magnavox Company, The: *See—*
Forbes, F. Douglas, 3,914,534.

Maier, Gerhard, to Maschinenfabrik B. Maier KG. Clamping mechanism for blades in rotary material removing tools. 3,913,645, Cl. 144-218.000.

Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, to Hitachi, Ltd. System for propelling train by linear synchronous motor. 3,913,493, Cl. 104-148.0SS.

Makita, Masahiro: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Maksymiak, John, to Xerox Corporation. Development utilizing electric fields. 3,914,460, Cl. 427-14.000.

Malaviya, Shashi Dhar, to International Business Machines Corporation. D.C. stable single device memory cell. 3,914,749, Cl. 340-173.00R.

Malcik, Frank John; Whittemore, Edward William; and Clark, John Patrick, to Swingline Inc. Support device for record elements. 3,913,995, Cl. 312-183.000.

Mallinson, Richard B.; and Mecklenborg, Richard A., to Singer Company, The. Cascaded relay for improved scheimpflug probe. 3,914,011, Cl. 350-50.000.

Mallonen, Edward A., to Cutler-Hammer, Inc. Three phase remote control circuit breaker. 3,914,722, Cl. 335-44.000.

Malmberg, Paul R., to Westinghouse Electric Corporation. Rapid exposure of micropatterns with a scanning electron microscope. 3,914,608, Cl. 250-311.000.

Maloney, Thomas W.: *See—*
Markarian, Kegham M.; Matty, Richard D.; Maloney, Thomas W.; and Moore, Thomas E., 3,914,526.

Manabe, Toshikatsu: *See—*
Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, 3,914,390.

Manecke, Siegfried E.; and Shaw, James L., to Robertshaw Controls Company. Shielded control device. 3,914,661, Cl. 317-118.000.

Mann, David: *See—*
Cobb, Leslie Hamilton; Mann, David; and Remmington, Timothy Alan, 3,914,471.

Mannesmann-Rohrenwerke AG: *See—*
Miller, Hermann; and Kuhn, Ernst, 3,914,060.

Manor, Doyle. Musical instrument. 3,913,441, Cl. 84-1.160.

Manson, Charles D., Jr., to Halliburton Company. Method and apparatus for preventing and detecting rotary drill bit failure. 3,913,686, Cl. 175-39.000.

Maquignaz, Mario; Benedetto, Bruno; and Lingeri, Antonio, to Ing. C. Olivetti & C., S.p.A. Machine for embossing type-rollers for office machines. 3,913,476, Cl. 101-7.000.

Maranell, Melvin C., to Sta-Tite Corporation. Rod post insulator for electric fences. 3,913,888, Cl. 256-10.000.

Marathon Oil Company: *See—*
Beazley, Phillip M., 3,914,399.

Marcell, William B. Measuring device. 3,913,232, Cl. 33-107.00R.

Marcell, William B. Measuring device. 3,913,233, Cl. 33-137.00R.

Marconi Company Limited, The: *See—*
Byatt, Dennis William George, 3,914,019.

Marek, Alois, to BBC Brown, Boveri & Company, Limited. Continuously controllable semi-conductor power component. 3,914,780, Cl. 357-37.000.

Margetts, Hugh Grenville, to Girling Limited. Shoe drum brakes. 3,913,710, Cl. 188-79.5GE.

Markarian, Kegham M.; Matty, Richard D.; Maloney, Thomas W.; and Moore, Thomas E., to Republic Steel Corporation. Force sensing control apparatus and method for electric arc furnaces. 3,914,526, Cl. 13-13.000.

Markovitch, Branko, to Simmons, Samuel P. Safety latch. 3,913,961, Cl. 292-262.000.

Marley Tile A.G.: *See—*
Curtis, Ivan, 3,914,485.

Maroshick, Max, to Boeing Company, The. Movable step assembly for transit vehicles. 3,913,497, Cl. 105-447.000.

Marrian, Stanley Frederic: *See—*
Gasson, Edward James; Marrian, Stanley Frederic; and Krosnar, Thomas Charles, 3,914,278.

Marsh, Barry John: *See—*
Lloyd, Brian Edwin; and Marsh, Barry John, 3,914,370.

Marsico, Joseph William, Jr.; and Goldman, Leon, to American Cyanamid Company. 2-Lower alkoxy-3-(lower alkylthio)-1,4-naphthoquinone. 3,914,264, Cl. 260-396.00R.

Martin, Frank E.; Colston, John R.; and Smith, Norman E., to Westinghouse Electric Corporation. Breathing apparatus. 3,913,576, Cl. 128-142.200.

Martin, Harlan W.: *See—*
Souza, Anthony J.; and Martin, Harlan W., 3,913,258.

Martin, James C.; Meen, Ronald H.; and Lewis, Howard M., to Eastman Kodak Company. Novel N-hydroxymethyl compounds, compositions containing such compounds and cellulose-containing textile materials treated therewith. 3,914,229, Cl. 260-256.40F.

Martin, James G., Jr. Indoor-outdoor goal with automatic return and storage compartment. 3,913,916, Cl. 273-103.000.

Martin, John Leroy: *See—*
Zell, Dale Richard; and Martin, John Leroy, 3,914,531.

Martonair Limited: *See—*
Kirk, Colin John, 3,914,754.

Martone, Ronald J.; Goldman, Samuel C.; and Dewhirst, Roy, to Picker Corporation. Apparatus and method for facilitating alignment of a collimator. 3,914,614, Cl. 250-515.000.

Marulic, Walter J.: *See—*
Knippel, Willis H.; and Marulic, Walter J., 3,913,267.

Marx, Helmut Hermann: *See—*
Dauner, Bertram Wilhelm-Georg; Marx, Helmut Hermann; and Wolfram, Karl-Heinz Arno, 3,913,480.

Maschinenfabrik B. Maier KG: *See—*
Maier, Gerhard, 3,913,645.

Maschinenfabrik Braun KG: *See—*
Braun, Alfons, 3,913,644.

Maschinenfabrik J. Dieffenbacher & Co.: *See—*
Pfeiffer, Heinrich, 3,914,154.

Maschinenfabrik Wifag: *See—*
Heimlicher, Paul; Rohrer, Jean; and Scharer, Willy, 3,913,855.
Muster, Hansruedi; and Rohrer, Jean, 3,913,900.

Maseki, Kyou-Ichi: *See—*
Sugiura, Minoru; and Maseki, Kyou-Ichi, 3,914,636.

Masham, Roger D.: *See—*
Basu, Samir K.; and Masham, Roger D., 3,914,049.

Mason, Frederick Percival, deceased (by Mason, Margaret Maud, executrix); and Patience, Brian Michael, to International Standard Electric Corporation. Selective printer power supply arrangement. 3,914,682, Cl. 321-47.000.

Mason, Margaret Maud, executrix: *See—*
Mason, Frederick Percival, deceased; and Patience, Brian Michael, 3,914,682.

Mason, Samuel H., Jr. Single engine-simulator of twin-engine. 3,913,244, Cl. 35-12.00B.

Mass Transfer Limited: *See—*
McKeown, Kevin Joseph; Ellis, Stephen Robert Mercer; and Priestley, Ronald, 3,914,351.

Massie, Stephen N., to Universal Oil Products Company. Hydrogenation of aromatic amines. 3,914,307, Cl. 260-563.00B.

Masters, David R.: *See—*
Benton, Samuel T.; and Masters, David R., 3,914,371.

Mastin, William H., Jr.: *See—*
Uitti, Paul M.; and Mastin, William H., Jr., 3,913,542.

Masuda, Michio: *See—*
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Mata, Justo M.: *See—*
Stapley, Edward O.; and Mata, Justo M., 3,914,157.
Stapley, Edward O.; and Mata, Justo M., 3,914,158.

Mata, Justo Martinez: *See—*
Hendlin, David; Stapley, Edward O.; Del Val, Sagrario Mochales; and Mata, Justo Martinez, 3,914,231.

Matera, Giancarlo: *See—*
Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, 3,914,313.

Mathews, Arno A.: *See—*
Tenneson, Milton T.; and Mathews, Arno A., 3,913,235.

Mathis, Donald Lee: *See—*
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Vorwerk, Richard, 3,913,452.
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Ranger, Eugene, 3,913,752.

Matier, William L.; and Comer, William T., to Mead Johnson & Company. 4-(3,4-Dichlorophenyl)-2-(methylamino)-2-imadazoline. 3,914,249, Cl. 260-309.600.

Matsuda, Motonobu: *See—*
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, 3,914,776.

Matsui, Masayuki: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Matsui, Tokio; and Katayama, Tateo, to Riken Seiki Kabushiki Kaisha; and Riken Kiki Kabushiki Kaisha. Rotary coupling for superhigh hydraulic pressure generating apparatus. 3,913,952, Cl. 285-281.000.

Matsumoto, Seiji: *See—*
Fukushima, Osamu; Sato, Masamichi; and Matsumoto, Seiji, 3,913,524.

Matsumura, Isao: *See—*
Takano, Eiichi; Takesi, Kunio; and Matsumura, Isao, 3,914,032.

Matsumura, Yutaka: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.

Matsuo, Kazunori: *See—*
Namiki, Ryoichi; Matsuo, Kazunori; and Watanabe, Mutsuo, 3,914,045.

Matsuoka, Mikio: *See—*
Hayashi, Ikuya; Uno, Keiichi; and Matsuoka, Mikio, 3,914,502.

Matsushita Electric Industrial Company: *See—*
Yonezawa, Kazuo; Nakao, Kaname; Suzuki, Takashi; and Kaneda, Satoshi, 3,914,161.

Matsushita Electric Industrial Company Limited: *See—*
Akao, Masatake; and Yamashita, Kazuo, 3,914,467.
Nishioka, Matsuo; and Oka, Shunzo, 3,914,728.
Ohkuma, Akihiro, 3,914,466.

Matsushita, Takeshi; Horinaga, Hiroshi; Ohtsu, Takaji; and Hayashi, Hisao, to Sony Corporation. Gate controlled rectifier. 3,914,781, Cl. 357-38.000.

Matsuura, Hideji. Low center of gravity cycle. 3,913,929, Cl. 280-7.140.

Mattas, Oliver E., Jr.: *See—*
Shaw, William H., 3,913,810.

Matth. Hohner AG: *See—*
Steinmetz, Hans-Joachim; Rahm, Helmut; and Paap, Karl-Ludwig, 3,914,746.

Matthews, George, to Magnasync Moviola Corporation. Film cutter. 3,913,433, Cl. 83-157.000.

Matthews, Larry Richard: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.

Matthews, Russell Byron, to Johnson Service Company. Direct spark ignition system with sampling flame sensor. 3,914,092, Cl. 431-66.000.

Matty, Richard D.: *See—*
Markarian, Kegham M.; Matty, Richard D.; Maloney, Thomas W.; and Moore, Thomas E., 3,914,526.

Maubois, Jean-Louis Joseph; Mocquot, Germain Pierre Charles Gabriel; and Vassal, Louis Jean, to Institut National de la Recherche Agronomique. Manufacture of cheese from ultrafiltered milk. 3,914,435, Cl. 426-40.000.

Maurer, William C.: *See—*
Howard, Willis W.; Maurer, William C.; and Lock, Everett H., 3,914,752.

Maxey, Eugene R., to Purex Corporation. Underwater light circuit. 3,914,592, Cl. 240-26.000.

Maxwell, Thomas J.: *See—*
Tums, Valdis M.; and Maxwell, Thomas J., 3,914,447.

May, William E.; and Netzel, Philip C., to I-T-E Imperial Corporation. Switchgear truck-mounted polyphase potential transformer and switch apparatus. 3,914,659, Cl. 317-103.000.

Mayer, Emil: *See—*
Esser, Paul; Mayer, Emil; and Rahn, Paul, 3,913,374.

Mayer Refrigerating Engineers, Inc.: *See—*
Occhetti, Louis, 3,913,904.

Maynard, John T., to Armor Elevator Company. D.C. motor control having gating control of a full-wave reactifier system. 3,914,674, Cl. 318-331.000.

Mayo, Alfred M.: *See—*
O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased, 3,914,577.

MCA Disco-Vision, Inc.: *See—*
Elliott, James E., 3,914,541.

McAllister, Lawrence E.: *See—*
Finelli, Thomas M.; Lenoe, Edward; and McAllister, Lawrence E., 3,914,395.

McCanney, Neil R., to Singer Company, The. Propeller sound simulation. 3,913,245, Cl. 35-12.00Q.

Mc Cartney, Ronald L., to International Telephone and Telegraph Corporation. Fiber optic connector and assembly method. 3,914,015, Cl. 350-96.00C.

McCauley, Porter Thompson, to Eagle Iron Works. Automated continuous classification and reblending system for sand and other granular material. 3,913,788, Cl. 222-64.000.

McClive, R. Thomas: *See—*
Sweeney, Donald J., 3,913,154.

McClure, Herman W., to Phillips Petroleum Company. Tensioned unrolling device for fabric rolls. 3,913,854, Cl. 242-75.400.

McConnell, Lorne D.; and Aumayer, Hansruedi, to I-T-E Imperial Corporation. Puffer interrupter with downstream initiated arc. 3,914,569, Cl. 200-148.00A.

McCoy, Frederic C.; and Swanson, Carl Loyal W., deceased (by Swanson, Viola C., executrix), to Texaco Inc. Solubilizing process. 3,914,308, Cl. 260-564.00F.

McCugh, Ralph M., to United States of America, Energy Research and Development Administration. Coil spring venting arrangement. 3,913,599, Cl. 137-1.000.

McDevitt, Bernard J.: *See—*
MacWade, Robert W.; and McDevitt, Bernard J., 3,914,677.

McDonald, David Ian, to Cincinnati Milacron Inc. Hydraulic cylinder with cushioning means. 3,913,451, Cl. 91-396.000.

McFarlane, Ross A.: *See—*
Wolga, George J.; and McFarlane, Ross A., 3,914,055.

McFarren, John E., to Thompson Chemicals, Inc. Continuous feed mixing apparatus. 3,913,894, Cl. 259-8.000.

McGahren, William James, to American Cyanamid Company. Antifungal compounds. 3,914,317, Cl. 260-592.000.

McGahren, William James; and Kunstmann, Martin Paul, to American Cyanamid Company. Amphotericin B derivatives. 3,914,409, Cl. 424-119.000.

McGillicuddy, John R., to Raymond Lee Organization, a part interest. Collapsible cart. 3,913,935, Cl. 280-36.000.

McGurk, Stanley E.; and Cowan, Wavell Frederick, to Highratio Screens Ltd. Pulp stock pressure screen. 3,914,172, Cl. 209-273.000.

McIntosh, Duane E., to General Motors Corporation. Data compression method and apparatus. 3,914,586, Cl. 235-154.000.

McKeown, Kevin Joseph; Ellis, Stephen Robert Mercer; and Priestley, Ronald, to Mass Transfer Limited. Packed tower and method of operation. 3,914,351, Cl. 261-98.000.

McKinley, William Earl: *See—*
Hollander, Betty Ruth; Coppola, Theodore Anthony; and McKinley, William Earl, 3,914,008.

McMurtry, David Roberts, to Rolls-Royce (1971) Limited. Fluid flow ducts. 3,913,626, Cl. 138-37.000.

McPhail, Joe L., to Pfeffer & Son. Method for introducing materials into or removing materials from a hermetically sealed vessel. 3,914,449, Cl. 426-461.000.

McQuain, David B.: *See—*
Glanz, Kenneth D.; and McQuain, David B., 3,914,510.

McSherry, William E., to Panduit Corporation. Cable tie support. 3,913,876, Cl. 248-74.0PB.

McVeigh, James H., to Xerox Corporation. Reversible screen for electrophotographic printing. 3,914,040, Cl. 355-3.00R.

McVeigh, James H., to Xerox Corporation. Color accenting copying machine. 3,914,043, Cl. 355-4.000.

Mead Corporation, The: *See—*
Frey, James A., 3,913,719.

Mead Johnson & Company: *See—*
Matier, William L.; and Comer, William T., 3,914,249.

Meaden, James B. Rotary internal combustion engine. 3,913,533, Cl. 123-8.450.

Meador, Jim D.: *See—*
Parker, Edward H.; Harris, Edward M.; and Meador, Jim D., 3,914,261.

Meadors, Howard Clarence, Jr., to Bell Telephone Laboratories, Incorporated. Repositioning of equalizer tap-gain coefficients. 3,914,691, Cl. 325-42.000.

Mebus, Charles A., to Board of Regents of the University of Nebraska, The. Vaccine for neonatal calf diarrhea. 3,914,408, Cl. 424-89.000.

Mecklenborg, Richard A.: *See—*
Mallinson, Richard B.; and Mecklenborg, Richard A., 3,914,011.

Medcraft Incorporated: *See—*
Streckmann, George L., 3,913,567.

Medenwald, Hans: *See—*
Boshagen, Horst; Geiger, Walter; and Medenwald, Hans, 3,914,242.

Medical Development Corporation: *See—*
Holbrook, Legrand K.; and Ostler, David S., 3,913,780.

Medical Instruments & Technology: *See—*
Ball, Newton E., 3,913,563.

Meen, Ronald H.: *See—*
Martin, James C.; Meen, Ronald H.; and Lewis, Howard M., 3,914,229.

Megadiamond Corporation: *See—*
Hall, Howard T., 3,913,280.

Meier, John G.: *See—*
Meylan, Jean-Luc Ch.; Frost, William H.; and Meier, John G., 3,913,667.

Meier, Werner, to Siemens Aktiengesellschaft. Storage device with several bistable flipflops. 3,914,627, Cl. 307-238.000.

Meiers, Gerald Franklyn, to Deere & Company. Bale wrapping mechanism for large cylindrical bales. 3,913,473, Cl. 100-5.000.

Meisels, Alex: *See—*
Schaffner, Karl; Meisels, Alex; Roger, Jean Claude; and Weis, Claus D., 3,914,222.

Meiser, Werner: *See—*
Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst, and Scheinpflug, Hans, 3,914,427.

Mel Optics Company: *See—*
Piazza, Carmelo, 3,913,390.

Melander, Rolf Edmund: *See—*
Hernsjo, Nils Einar; and Melander, Rolf Edmund, 3,913,515.

Melanson, Roland J., to General Electric Company. Overvoltage surge arrester for electric meters. 3,914,657, Cl. 317-61.500.

Melindo, Flavio; and Perucca, Giovanni, to CSELT-Centro Studi e Laboratori Telecomunicazioni SpA. Multiplexing/demultiplexing network with series/parallel conversion for TDM system. 3,914,553, Cl. 179-15.0AT.

Melki, Georges: *See—*
Askienazy, Alexandre; and Melki, Georges, 3,914,411.

Menley & James Laboratories, Ltd.: *See—*
Yankell, Samuel L., 3,914,406.

Merck & Company,: *See—*
Baldwin, John J.; and Novello, Frederick C., 3,914,246.

Merck & Co., Inc.: *See—*
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,914,253.
Hendlin, David; Stapley, Edward O.; Del Val, Sagrario Mochales; and Mata, Justo Martinez, 3,914,231.
Patchett, Arthur A.; Mrozik, Helmut H.; and Hoff, Dale R., 3,914,418.
Pines, Seemon H., 3,914,318.
Stapley, Edward O.; and Mata, Justo M., 3,914,157.
Stapley, Edward O.; and Mata, Justo M., 3,914,158.

Mercurio, Andrew; and Sperry, Peter R., to Rohm and Haas Company. Method of protecting substrates with light-stable varnish or lacquer. 3,914,463, Cl. 427-54.000.

Merjan, Stanley. Piling. 3,913,337, Cl. 61-50.000.

Messner, George A., to O'Reilly, Thomas B. Typewriter with yieldable type bar. 3,913,720, Cl. 197-17.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Kunz, Otto; Hartmann, Rainer; and Nicolay, Johann, 3,914,175.
von Jordan, Wenzel; Barth, Hans-Jorg; Koch, Hans; and Boning, Gunter, 3,914,387.

Meyer, Engelbert A., to USM Corporation. Rod retaining clip. 3,914,061, Cl. 403-197.000.

Meyer, Roth & Pastor Maschinenfabrik GmbH: *See—*
Esser, Paul; Mayer, Emil; and Rahn, Paul, 3,913,374.

Meylan, Jean-Luc Ch.; Frost, William H.; and Meier, John G., to Battelle Memorial Institute. Heat exchanger. 3,913,667, Cl. 165-115.000.

Microcomb Structures Limited: *See—*
Broad, Michael Charles, 3,913,210.

Middleton, William Joseph, to Du Pont de Nemours, E. I., and Company. Dialkylaminosulfur trifluorides as fluorinating agents. 3,914,265, Cl. 260-397.300.

Miers, Bruce W.: *See—*
Baldwin, Arden E.; Carlson, Harold W.; and Miers, Bruce W., 3,913,987.

Mieville, Andre, to Orchimed S.A. Lower alkyl esters of p-benzoylphenoxy isobutyric acid. 3,914,286, Cl. 260-473.00G.

Milan-Kamski, Wojslaw J.: *See—*
Gruodis, Romualdas K.; Botula, Bernard C.; and Milan-Kamski, Wojslaw J., 3,913,730.

Miller, Brian S., to United States of America, Army. Tunnel emitter photocathode. 3,913,218, Cl. 29-585.000.

Miller, George A.; Lewis, Sheldon N.; and Weiler, Ernest D., to Rohm and Haas Company. Acrylamide derivatives of 3-isothiazolones. 3,914,301, Cl. 260-561.00S.

Miller, Hermann; and Kuhn, Ernst, to Mannesmann-Rohrenwerke AG. Connecting structure for frames, scaffolds, lattice structure or the like. 3,914,060, Cl. 403-171.000.

Miller, Hobson F., to United States Banknote Corporation. Fluid container of the flexible wall capsule type. 3,913,789, Cl. 222-107.000.

Miller, Jaydee W., to Sun Oil Company of Pennsylvania. Apparatus for gas-fog reaction processes. 3,914,615, Cl. 250-531.000.

Miller, Jerry E., to Globe Tool and Engineering Company, The. Armature winding method. 3,913,220, Cl. 29-597.000.

Miller, John J.: *See—*
Collins, Floyd K.; and Miller, John J., 3,914,638.

Miller, Ralph H. Heavier-than-air passenger aircraft. 3,913,871, Cl. 244-5.000.

Miller, Richard C.: *See—*
Visser, Peter J.; and Miller, Richard C., 3,913,933.

Miller, Walter A.; and Jenkinson, Richard D., to Union Carbide Corporation. Porous products and processes therefor. 3,914,501, Cl. 428-296.000.

Miller, Wayne Russel; and Lucke, Robert James, Jr., to Deere & Company. Flow-sensing switch for backup steering system. 3,913,324, Cl. 60-405.000.

Miller, William J.: *See—*
Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., 3,913,553.

Millhollan, Michael S.; and Treadway, Ronald L., to Motorola, Inc. Decode circuitry for bipolar random access memory. 3,914,620, Cl. 307-215.000.

Mills, Thomas Gene; and Valino, Beethoven Corpus, to TRW Inc. Integrated circuit transistor switch. 3,913,213, Cl. 29-577.000.

Minakata, Itsuo: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.

Minami, Junichi: *See—*
Takatsu, Mitsumune; Ohnishi, Fumio; and Minami, Junichi, 3,914,454.
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, 3,914,448.

Mine Safety Appliances Company: *See—*
Madden, James F.; and Scott, Gordon C., 3,913,570.

Mineral Research & Development Corporation: *See—*
Drinkard, William F., Jr.; and Brown, Henry S., 3,914,163.

Minett, Herbert Hargrave Basil; and Stockwell, Gordon Horsford, to Hawker Siddeley Dynamics Limited. Air conditioning systems. 3,913,833, Cl. 236-49.000.

Minnesota Mining and Manufacturing Company: *See—*
Condon, John B.; and Harrington, Thomas L., 3,914,468.
Dreyer, John F., 3,914,016.
Eikvar, Tore, 3,914,125.
Lunde, George G.; and Opseth, Stan J., 3,914,771.
Vogelgesang, Peter J.; and Lunquist, Frank C., 3,914,775.

Minolta Camera Kabushiki Kaisha: *See—*
Ogawa, Masaya, 3,914,044.
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, 3,914,046.
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, 3,914,776.

Mintz, Gary; Mintz, S. Stanley; and Pierce, Robert B. Combination pool table and couch. 3,913,973, Cl. 297-127.000.

Mintz, S. Stanley: *See—*
Mintz, Gary; Mintz, S. Stanley; and Pierce, Robert B., 3,913,973.

Misawa, Yutaka; and Yagi, Hideyuki, to Hitachi, Ltd. Method of producing a semiconductor device. 3,913,217, Cl. 29-580.000.

Mitchell, John H., to Dow Chemical Company, The. Ethylene polymer blend and polymerization process for preparation thereof. 3,914,342, Cl. 260-897.00A.

Miter, Inc.: *See—*
Driskell, Thomas D.; Heller, Alfred L.; and Koenigs, Joseph F., 3,913,229.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Nakata, Josuke, 3,914,782.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Katsuta, Kihei, 3,913,341.
Nishio, Yasuhiro; Ohmae, Takashi; and Yoshida, Yasuyuki, 3,914,506.

Mitsui Shipbuilding and Engineering Co., Ltd.: *See—*
Hirose, Kiyoshi; Shiozawa, Kaoru; and Saito, Yuzi, 3,913,819.

Mitsuya, Yoshihide, to Mitsuya, Yoshihide. Mechanical pencil. 3,914,059, Cl. 401-67.000.

Mitzlaff, Michael: *See—*
Schnabel, Horst; and Mitzlaff, Michael, 3,914,304.

Miwa Lock Co., Ltd: *See—*
Nakane, Sunao; and Wake, Kiyoyasu, 3,913,170.

Miyadera, Tetsuo: *See—*
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.

Miyake, Akihisa; Kondo, Hisao; Nishidoi, Takashi; and Onnagawa, Osamu, to Toray Industries, Inc. Method for preparing 5-cyclohexadecen-1-on. 3,914,315, Cl. 260-586.00R.

Miyamae, Toshiaki. Fishing line guide device. 3,913,859, Cl. 242-84.410.

Miyanohara, Isao: *See—*
Otsuki, Susumu; and Miyanohara, Isao, 3,914,290.

Miyao, Takayuki; and Sakai, Toshimitsu, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Aisin Seiki Kabushiki Kaisha. Output split type hydrostatic transmission. 3,913,325, Cl. 60-431.000.

Miyao, Takayuki; and Sakai, Toshimitsu, to Aisin Seiki Kabushiki Kaisha; and Toyota Jidosha Kogyo Kabushiki Kaisha. System for controlling the drive and dynamic braking of automobiles. 3,913,418, Cl. 74-856.000.

Miyashita, Takao: *See—*
Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, 3,913,493.

Miyasita, Satoru: *See—*
Kambara, Kenjiro; Tanaka, Sakae; and Miyasita, Satoru, 3,913,755.

Miyata, Yoshimitsu: *See—*
Ueki, Shiro; and Miyata, Yoshimitsu, 3,914,354.

Mizusawa Kagaku Kogyo Kabushiki Kaisha: *See—*
Sugahara, Yujiro; Naito, Hiroyuki; Takahashi, Akira; and Takai, Kiyoshi, 3,914,381.

Mobil Oil Corporation: *See—*
Anderson, Conroy D.; Carlson, David W.; Oleck, Stephen M.; and Stover, William A., 3,914,377.
Blount, Floyd E.; Becker, Reinhard F.; Lechler, Siegfried; and Ockelmann, Helmut, 3,913,678.
Lucki, Stanley J.; Chen, Nai Yuen; and Bowes, Emerson, 3,914,331.
Schoennagel, Hans-Juergen, 3,914,171.

Mochida, Ei. Apparatus for automatically distributing a determined amount of liquid. 3,913,636, Cl. 141-130.000.

Mocquot, Germain Pierre Charles Gabriel: *See—*
Maubois, Jean-Louis Joseph; Mocquot, Germain Pierre Charles Gabriel; and Vassal, Louis Jean, 3,914,435.

Modic, Frank J.; and Dujack, George M., to General Electric Company. Process for preparing silicone rubber molds from leather masters. 3,914,369, Cl. 264-225.000.

Mogami, Akinori: *See—*
Hashimoto, Hiroshi; and Mogami, Akinori, 3,914,606.

Mohacsi, Ernest; and Leimgruber, Willy, to Hoffmann-La Roche Inc. 2-And 4-acryloxy-N-substituted-morphinan derivatives. 3,914,232, Cl. 260-285.000.

Mohacsi, Ernest; and Leimgruber, Willy, to Hoffmann-La Roche Inc. 4-Hydroxy-N-substituted morphinan derivatives. 3,914,233, Cl. 260-285.000.

Mohacsi, Ernest; and Leimgruber, Willy, to Hoffman-La Roche Inc. 2-Lower alkoxy-N-substituted-morphinan derivatives. 3,914,234, Cl. 260-285.000.

Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, to Hitachi Limited; and Nippon Hoso Kyokai. Identifier for a pulse code modulated signal. 3,914,536, Cl. 178-5.80R.

Mohri, Katsuo: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Moisio, Tauno Vihtori: *See—*
Kreula, Matti Siimoni; and Moisio, Tauno Vihtori, 3,913,383.

Molders, Werner, to Stabilus GmbH. Resilient supporting column of adjustable length. 3,913,901, Cl. 267-34.000.

Mommer, Richard Paul, to Loveland Industries, Inc. Cleanser for pesticide application means. 3,913,555, Cl. 134-22.00R.

Mongold, Gerald H.: *See—*
Hubing, James H.; and Mongold, Gerald H., 3,914,715.

Monsanto Company: *See—*
Barker, George E., 3,914,376.
Brown, Jasper H.; Cooper, John A.; and Morgan, Albert W., 3,914,503.
Kowalski, Xavier, 3,914,162.

Monte, Robert W., to Nashua Corporation. High amylopectin starch adhesive composition and adhesive tape. 3,914,524, Cl. 428-533.000.

Montecatini Edison S.p.A.: *See—*
Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, 3,914,396.

Moody, Harold W., Jr.; and Hamilton, Clark B., to Dunham Bush, Inc. Liquid refrigerant injection system for hermetic electric motor driven helical screw compressor. 3,913,346, Cl. 62-197.000.

Mooibroek, Joseph. Smoke detector. 3,914,616, Cl. 250-574.000.

Mooney, Thomas: *See—*
Eidelberg, Jonah; and Mooney, Thomas, 3,913,956.

Moore, Barry Anthony. Apparatus for controlling epicyclic motion of a rotor in a rotary engine. 3,913,408, Cl. 74-63.000.

Moore, Derek Stanley: *See—*
Smith, Francis Hughes; and Moore, Derek Stanley, 3,914,057.

Moore, Francis C.; Perkinson, Leon R.; and Brown, Billy E., to Moore-Perk Corporation. Disposable package for collecting and transporting cultures for laboratory analysis. 3,913,562, Cl. 128-2.00W.

Moore, Keith Oswin: *See—*
Green, Paul Clifford; and Moore, Keith Oswin, 3,913,455.

Moore-Perk Corporation: *See—*
Moore, Francis C.; Perkinson, Leon R.; and Brown, Billy E., 3,913,562.

Moore, Richard L. Pulsating plasma device. 3,914,766, Cl. 343-701.000.

Moore, Thomas E.: *See—*
Markarian, Kegham M.; Matty, Richard D.; Maloney, Thomas W.; and Moore, Thomas E., 3,914,526.

Morane, Bruno P.; and Alexandre, Pierre, to L'Oreal. Heated hair roller. 3,913,592, Cl. 132-33.000.

Morgan, Albert W.: *See—*
Brown, Jasper H.; Cooper, John A.; and Morgan, Albert W., 3,914,503.

Morishita, Hajime; and Nonogaki, Saburo, to Hitachi, Ltd. Method for forming a resist mask using a positive electron resist. 3,914,462, Cl. 427-43.000.

Morley, Carl H.; and Burkardt, Lohr A., to United States of America, Navy. Ice nuclei counter. 3,914,053, Cl. 356-37.000.

Morris, Earl F.; and Croft, Jimmy L., to Morris, Earl F. Illuminated fishing float apparatus. 3,913,256, Cl. 43-17.500.

Morris, Louis P., to Robertshaw Controls Company. Gas burner orifice. 3,913,846, Cl. 239-597.000.

Morrison, James J., to Kasle Steel Corporation. Headlight cleaning attachment. 3,913,166, Cl. 15-250.010.

Morrow, Duane L.: *See—*
Wirt, Leslie S.; and Morrow, Duane L., 3,913,702.

Morse, John E., to Eastman Kodak Company. Web support with castered and gimballed roller. 3,913,813, Cl. 226-21.000.

Morton, John; Stevens, Keith Drummond; and Thexton, Graham Spencer, to Cableform Limited. Control means for electric motors operated from batteries. 3,914,671, Cl. 318-139.000.

Morton, Max L.: *See—*
Stonack, George H., 3,913,651.

Morton-Norwich Products, Inc.: *See—*
Snyder, Harry R., Jr., 3,914,220.

Morton, Richard G.: *See—*
Friedman, Herbert W.; Caristi, Robert F.; and Morton, Richard G., 3,914,648.

Mosher, Charles E.: *See—*
Copp, Donald G.; Ellsworth, James C.; and Mosher, Charles E., 3,913,773.

Mosier Industries, Inc.: *See—*
Wright, Lee A., 3,913,460.

Motorola Inc.: *See—*
Huffman, Tommie R.; and Coleman, Michael G., 3,914,137.
Millhollan, Michael S.; and Treadway, Ronald L., 3,914,620.

Mottier, Francois M.; and Dandliker, Rene, to BBC Brown, Boveri & Company, Limited. Apparatus for evaluating holographically reconstructed wave fields with two frequencies. 3,914,056, Cl. 356-109.000.

Moulet, Camille, to Crinospital S.p.A. Device for controlling the flow of fluid through flexible tubes. 3,913,882, Cl. 251-9.000.

Moulin, Norbert L., to Hughes Aircraft Company. Method for replacement of wire seal, electrical contact. 3,913,206, Cl. 29-401.000.

Moyer, Wendell W., Jr.: *See—*
Bedard, Ronald L.; Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., 3,914,363.

Mrozik, Helmut H.: *See—*
Patchett, Arthur A.; Mrozik, Helmut H.; and Hoff, Dale R., 3,914,418.

MTS Systems Corporation: *See—*
Larson, Rodney L., 3,913,389.

Muehlberger, Erich, to Geotel, Inc. Coating heat softened particles by projection in a plasma stream of Mach 1 to Mach 3 velocity. 3,914,573, Cl. 219-76.000.

Mueller Co.: *See—*
Floren, Carl E., 3,913,400.

Mueller, Walter A., to Pulp and Paper Research Institute of Canada. Production of chlorine monoxide gas. 3,914,397, Cl. 423-462.000.

Mulder, Jan: *See—*
Diemer, Willem Hildebrand; Zwep, Gerrit; and Mulder, Jan, 3,914,633.

Muller, Ernst; and Popovic, Dragan, to Erste Deutsche Floatglas GmbH. & Co. Carrying frame for giant glass sheets. 3,913,965, Cl. 294-67.00R.

Multiply Development Corporation, Ltd.: *See—*
Lambert, Robert D., 3,913,643.

Mundye, Anthony Arnold John: *See—*
Byford, Derek Clark; and Mundye, Anthony Arnold John, 3,914,179.

Munro, Robert: *See—*
Hill, Harold Taylor; and Munro, Robert, 3,914,574.

Munster, Ebbe; and Ponsaing, Per, to Instituttet for Produktudvikling. Apparatus for use in optical reading machines for transforming a two-dimensional line pattern into opto-electronically detectable images. 3,914,742, Cl. 340-146.30F.

Muralidhara, Ranya: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.

Muraoka, Hiroshi; Narui, Michinori; and Sugiyama, Keiji, to Pioneer Electronic Corporation. Method for producing a multichannel magnetic head. 3,913,221, Cl. 29-603.000.

Murase, Kenji; Ishizaki, Hiroyuki; and Kurahashi, Keizo, to Fujitsu Limited. Display apparatus. 3,914,761, Cl. 340-366.00B.

Murphy, James: *See—*
Somlo, Tibor; and Murphy, James, 3,914,263.

Murphy, John A.: *See—*
Beckerman, Martin; Murphy, John A.; Orlandi, John V.; and Smith, George W., 3,914,000.

Murray, James E.: *See—*
Lania, Anthony R.; Chase, Edward L.; Chase, Francis M.; Graham, Leonard P.; and Murray, James E., 3,914,495.

Musgrave, Daniel D. Shield for ballistic cutters. 3,913,252, Cl. 42-90.000.

Muster, Hansruedi; and Rohrer, Jean, to Maschinenfabrik Wifag. Device for regulating the tension in a running web. 3,913,900, Cl. 226-44.000.

Mutafelija, Boris A.: *See—*
Alliston, William H.; Johnson, Steven J.; and Mutafelija, Boris A., 3,914,795.

Muxfeldt, Hans H., to Research Corporation. Tetracyclines. 3,914,299, Cl. 260-559.0AT.

Naarmann, Herbert; and Pohlemann, Heinz, to BASF Aktiengesellschaft. Oligomers of diisopropylbenzene. 3,914,329, Cl. 260-668.00R.

Nabeyama, Hiroaki: *See—*
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Nagase, Hiroshi; and Ban, Hitoshi, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Physical quantity detecting circuit. 3,913,392, Cl. 73-88.5SD.

Nagel, Ludmilla V. Process for preparing a protein-enriched food product. 3,914,457, Cl. 426-589.000.

Nahta, Roop; Bernholz, William F.; Redston, John Percy; and Warman, Murray, to PVO International Inc. Hydroxy pivalyl hydroxy pivalate esters and method of treating textile filaments therewith. 3,914,177, Cl. 252-8.800.

Naito, Hiroyuki: *See—*
Sugahara, Yujiro; Naito, Hiroyuki; Takahashi, Akira; and Takai, Kiyoshi, 3,914,381.

Nakadai, Tadanobu; Nasuno, Seiichi; and Iguchi, Nobuyoshi, to Noda Institute For Scientific Research. Process for manufacturing soy sauce using enzymatic preparation(s). 3,914,436, Cl. 426-46.000.

Nakagawa, Keizo: *See—*
Hara, Satoshi; Akino, Morio; and Nakagawa, Keizo, 3,913,856.

Nakajima, Tsunemasa: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Dual brake system fault detection device. 3,914,736, Cl. 340-52.00C.

Nakane, Sunao; and Wake, Kiyoyasu, to Miwa Lock Co., Ltd; and Showa Seisakusho Co. Door closer. 3,913,170, Cl. 16-58.000.

Nakanishi, Shigeaki; Takezawa, Yoshio; and Yamaguchi, Akio, to Toray Industries, Inc. Process for metallizing the surface of a polyamide resin molded article. 3,914,472, Cl. 427-250.000.

Nakao, Kaname: *See—*
Yonezawa, Kazuo; Nakao, Kaname; Suzuki, Takashi; and Kaneda, Satoshi, 3,914,161.

Nakata, Josuke, to Mitsubishi Denki Kabushiki Kaisha. Reverse conducting thyristor and process for producing the same. 3,914,782, Cl. 357-38.000.

Namie, Koshi: *See—*
Takeda, Shinichi; Harada, Tomio; Namie, Koshi; and Hara, Kotaro, 3,914,287.

Namiki, Ryoichi; Matsuo, Kazunori; and Watanabe, Mutsuo, to Kabushiki Kaisha Ricoh. Method and apparatus for removing residual image from photoconductive element of electrophotographic copying machine. 3,914,045, Cl. 355-15.000.

Napor, Carl A. Method and means for forming composite plastic and wooden members. 3,914,475, Cl. 427-291.000.

Narita, Koji: *See—*
Sawa, Hiroshi; Aratani, Isamu; and Narita, Koji, 3,914,482.

Narui, Michinori: *See—*
Muraoka, Hiroshi; Narui, Michinori; and Sugiyama, Keiji, 3,913,221.

Nash, Robert Arnold: *See—*
Haeger, Bruce Edwin; and Nash, Robert Arnold, 3,914,419.

Nashua Corporation: *See—*
Monte, Robert W., 3,914,524.

Nasuno, Seiichi: *See—*
Nakadai, Tadanobu; Nasuno, Seiichi; and Iguchi, Nobuyoshi, 3,914,436.

National Manufacturing Company: *See—*
Stahl, William J., 3,913,435.

National Patent Development Corporation: *See—*
Shepherd, Thomas H.; and Gould, Francis E., 3,914,405.

NCR Corporation: *See—*
Glanz, Kenneth D.; and McQuain, David B., 3,914,510.

Negoro, Sentaro: *See—*
Nishimura, Akira; Akamatsu, Hiroshi; Negoro, Sentaro; and Yoshida, Yasutoshi, 3,913,259.

Negstad, Robert D.: *See—*
Kennedy, James H.; and Negstad, Robert D., 3,913,696.

Nehra, Samuel A.; Saad, Oscar C.; and LaBrecque, Raymond E. Aspirator tip. 3,913,577, Cl. 128-276.000.

Nelsen, Roger Jacob; and Johnson, Earl Willard, to Gulf & Western Manufacturing Company. Apparatus for necking-in can bodies. 3,913,366, Cl. 72-121.000.

Nelson, Elric J.: *See—*
Pietras, Edward F.; and Nelson, Elric J., 3,914,584.

Nelson, Hugh A.: *See—*
Dixon, George D.; and Nelson, Hugh A., 3,914,358.

Nelson, John, to Leesona Corporation. Single conveyor system for bobbins about a textile apparatus. 3,913,743, Cl. 209-73.000.

Nelson, Roger John, to Deere & Company. Hydraulic motor. 3,913,454, Cl. 91-491.000.

Nelson, Roger John: *See—*
Koch, James Allan; Nelson, Roger John; and Henderson, Donald LeRoy, 3,913,449.

Nelson, Warren J.; and Fauth, Donald A., to Reynolds Metals Company. Electrical grounding apparatus and method and washer for use therewith. 3,914,001, Cl. 339-14.00R.

Nemrod-Metzeler, S.A.: *See—*
Vilarrubis, Juan, 3,913,158.

Nersasian, Arthur, to Du Pont de Nemours, E. I., and Company. Storage stable crude isocyanates and production thereof. 3,914,269, Cl. 260-453.0PH.

Netzel, Philip C.: *See—*
May, William E.; and Netzel, Philip C., 3,914,659.

Neufang, Karlheinz, to Siemens Aktiengesellschaft. PCM time-division multiplex switching procedure. 3,914,552, Cl. 179-15.0AQ.

Neugebauer, Alfred: *See—*
Thaler, Kurt; and Neugebauer, Alfred, 3,913,432.

New Century Novelty Company PTY. Ltd.: *See—*
Richards, Basil James; and Adams, Roger Anthony, 3,913,922.

New Jersey Zinc Company, The: *See—*
Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, 3,914,396.

Newage Engineers Limited: *See—*
Green, Paul Clifford; and Moore, Keith Oswin, 3,913,455.

Newash, Mahmoud S., to Dow Corning Corporation. Implantable extendable member. 3,913,587, Cl. 128-348.000.

Newcomer, Michael Paul, to Du Pont de Nemours, E. I., and Company. Process for adding particulate cellulose to alkali cellulose. 3,914,130, Cl. 106-163.000.

Newell, Jon Albert: *See—*
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.

Newman, Ritchey O., Jr.: *See—*
Gunderman, Roland E.; and Newman, Ritchey O., Jr., 3,914,360.

Newstead, Charles; and Wright, Andrew Charles Walden, to Girling Limited. Disc brake assemblies for vehicles. 3,913,708, Cl. 188-71.900.

Nicholson, G. W.: *See—*
Brinton, Rodric E., 3,913,149.

Nicolay, Johann: *See—*
Kunz, Otto; Hartmann, Rainer; and Nicolay, Johann, 3,914,175.

Niedermeyer, Karl O. Electrical plug with ground prong activated switch. 3,914,565, Cl. 200-51.090.

Niehaus, Horst, to Vereinigte Flugtechnische Werke-Fokker GmbH. Testing of aircraft equipment. 3,913,394, Cl. 73-118.000.

Niehaus, William R., to E. W. Scripps Company, The. Method and apparatus for reconstituting color images. 3,914,788, Cl. 358-75.000.

Niessner, Adam: *See—*
Ehret, Yale W.; and Niessner, Adam, 3,913,265.

Nifco Inc.: *See—*
Okuda, Seizi, 3,913,187.

Nihon Beru-Haueru Kabushiki Kaisha: *See—*
Katahira, Yukio; and Saito, Seiichi, 3,913,868.

Nihon Denshi Kabushiki Kaisha: *See—*
Hashimoto, Hiroshi; and Mogami, Akinori, 3,914,606.

Niles Parts Company Limited: *See—*
Sato, Hitoshi, 3,914,737.

Nilson, Billy. Valve for detecting pressure differences. 3,913,809, Cl. 222-494.000.

Nilux Holding Societe Anonyme: *See—*
Davidson, Raymond John, 3,914,123.

Nimylowycz, Osyp, to United States of America, Army. Mechanical spreader for a parachute. 3,913,873, Cl. 244-149.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Deutsch, Ralph, 3,913,442.

Nippon Hoso Kyokai: *See—*
Iwai, Yoshihiro; and Tanaka, Kunihiko, 3,914,033.
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 3,914,713.
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Nippon Kogaku K.K.: *See—*
Kanno, Hideo, 3,914,026.
Kawahara, Atsushi; and Yamada, Koji, 3,914,543.
Terunuma, Hiroshi, 3,914,779.
Wakahara, Shigeo, 3,914,036.

Nippon Kokan Kabushiki Kaisha: *See—*
Fujii, Seiji; Kamata, Masamoto; Ishida, Masayuki; and Kuwamoto, Hiroshi, 3,913,363.
Kozasu, Isao; and Shimizu, Teruhiko, 3,914,135.

Nippon Steel Corporation: *See—*
Kambara, Kenjiro; Tanaka, Sakae; and Miyasita, Satoru, 3,913,755.

Nishidoi, Takashi: *See—*
Miyake, Akihisa; Kondo, Hisao; Nishidoi, Takashi; and Onnagawa, Osamu, 3,914,315.

Nishimura, Akira; Akamatsu, Hiroshi; Negoro, Sentaro; and Yoshida, Yasutoshi, to Earth Chemical Company, Limited. Composition and device for capturing cockroaches. 3,913,259, Cl. 43-114.000.

Nishimura, Izuhiko, to Kabushiki Kaisha Suwa Seikosha. Liquid crystal display device with improved contact means. 3,914,021, Cl. 350-160.0LC.

Nishio, Yasuhiro; Ohmae, Takashi; and Yoshida, Yasuyuki, to Mitsubishi Jukogyo Kabushiki Kaisha. Welding material for austenitic stainless steels. 3,914,506, Cl. 428-385.000.

Nishioka, Matsuo; and Oka, Shunzo, to Matsushita Electric Industrial Co., Ltd. Variable resistor provided with means for memorizing a set value of resistance. 3,914,728, Cl. 338-119.000.

Nishiwaki, Kiyoshi: *See—*
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 3,914,736.

Nissan Motor Company Limited: *See—*
Aikawa, Hiroshi; and Ito, Naganori, 3,913,938.

Nissei Plastics Industrial Co., Ltd.: *See—*
Aoki, Katashi, 3,913,796.

Nisshin Oil Mills, Ltd., The: *See—*
Sakita, Takashi; and Taguchi, Gyota, 3,914,443.

Nissin Shokuhin Kaisha, Ltd.: *See—*
Takatsu, Mitsumune; Ohnishi, Fumio; and Minami, Junichi, 3,914,454.
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, 3,914,448.

Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, to Wacker-Chemie GmbH. Method for imparting water repellency to inorganic surfaces. 3,914,476, Cl. 427-337.000.

Nobbs, Arthur Joseph: *See—*
Jack, Harry Ross Scarlett; and Nobbs, Arthur Joseph, 3,914,119.

Noblett, Michael G.: *See—*
MacKenzie, George D.; and Noblett, Michael G., 3,914,514.

Noda Institute For Scientific Research: *See—*
Nakadai, Tadanobu; Nasuno, Seiichi; and Iguchi, Nobuyoshi, 3,914,436.

Nonaka, Tadashi: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.

Nonnenmann, Manfred, to Suddeutsche Kuhlerfabrik. Fan for motor vehicles. 3,914,068, Cl. 416-132.000.

Nonogaki, Saburo: *See—*
Morishita, Hajime; and Nonogaki, Saburo, 3,914,462.

Norbalt Rubber Corporation: *See—*
Stefanka, Joseph Anthony, 3,914,101.

Norris, Max E., to SCM Corporation. Fluid shortening. 3,914,452, Cl. 426-549.000.

Norsby, Norrain E.; and Schultz, James R., to General Mills, Inc. Dry mix pudding composition. 3,914,456, Cl. 426-579.000.

North American Philips Corporation: *See—*
Hirschhorn, Ralph Isaac; and Bhusri, Gurcharan Singh, 3,914,656.

Northern Electric Company Limited: *See—*
Coderre, William Michael; Berglund, Carl Neil; and Tillman, Philip Robert, 3,914,642.
Han, Swan Bing, 3,914,740.

Norton Company: *See—*
Jones, Cecil M., 3,913,281.

Nosaka, Yoshinori: *See—*
Fukushima, Keitaro; Kishimoto, Soichiro; and Nosaka, Yoshinori, 3,914,394.

Nossar, Mstislav: *See—*
Chaikin, Malcolm; and Nossar, Mstislav, 3,913,241.

Novak, Richard C.: *See—*
Brennan, John J.; Novak, Richard C.; and De Crescente, Michael A., 3,914,500.

Novello, Frederick C.: *See—*
Baldwin, John J.; and Novello, Frederick C., 3,914,246.

Nozaki, Kenzie, to Shell Oil Company. Preparation of $HPd(CN)_3$. 3,914,391, Cl. 423-364.000.

Nozawa, Masaaki: *See—*
Yamagishi, Kazuo; Nozawa, Masaaki; and Tokumoto, Tsunenori, 3,914,091.

Nu-Vu Company of Wisconsin, Inc.: *See—*
Caron, Thomas E., 3,914,027.

Nugent, William A.; Williams, William Lloyd; and Bogle, Hugh A., to West Chester Chemical Company. Snow fence. 3,913,889, Cl. 256-12.500.

Numabe, Hitomi, to Kabushiki Kaisha Suwa Seikosha. Solid state electronic timepiece. 3,913,312, Cl. 58-50.00R.

Nussbaumer, Henri J., to International Business Machines Corporation. Digital filters. 3,914,588, Cl. 235-156.000.

Nylen, Olle, to Aktiebolaget Electrolux. Commutator for electric machines and method of making such a commutator. 3,914,632, Cl. 310-234.000.

O'Brien Corporation: *See—*
O'Brien, Edward J., 3,913,835.

O'Brien, Edward J., to O'Brien Corporation. Freeze-proof steam trap system, package and method. 3,913,835, Cl. 237-67.000.

Occhetti, Louis, to Mayer Refrigerating Engineers, Inc. Stacking machine for rubber or the like sheet material. 3,913,904, Cl. 270-30.000.

Occidental Petroleum Corporation: *See—*
Logan, Forrest E., 3,913,800.

Ochs, Charles S., to Anchor Hocking Corporation. Tamperproof closure cap and sealed package. 3,913,772, Cl. 215-256.000.

Ockelmann, Helmut: *See—*
Blount, Floyd E.; Becker, Reinhard F.; Lechler, Siegfried; and Ockelmann, Helmut, 3,913,678.

O'Dell Manufacturing, Inc.: *See—*
Hall, Frank Kenneth, 3,913,526.

Oellerer, Friedrich: *See—*
Theurer, Josef; and Oellerer, Friedrich, 3,913,490.

Ogawa Hoso System Kabushiki Kaisha: *See—*
Sato, Eiichi, 3,914,153.

Ogawa, Kazuhiro: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 3,914,160.

Ogawa, Masaya, to Minolta Camera Kabushiki Kaisha. Surface exposure device for copying apparatus. 3,914,044, Cl. 355-8.000.

Ogino, Toshio. Temporary curtains. 3,913,655, Cl. 160-84.00R.

Oglesbee, Richard K., to Anchor Hocking Corporation. Package for tumblers and the like. 3,913,778, Cl. 220-23.830.

Ohkuma, Akihiro, to Matsushita Electric Industrial Co., Ltd. Method for coating an article. 3,914,466, Cl. 427-101.000.

Ohlen, Gilbert M., to Rockwell International Corporation. Calibration test apparatus. 3,914,693, Cl. 325-134.000.

Ohm, Edward Allen, to Bell Telephone Laboratories. Apparatus for reducing cross coupling between orthogonal polarizations in satellite communication systems. 3,914,764, Cl. 343-100.0PE.

Ohm, Edward Allen, to Bell Telephone Laboratories, Incorporated. Multiple-beam Cassegrainian antenna. 3,914,768, Cl. 343-779.000.

Ohmae, Takashi: *See—*
Nishio, Yasuhiro; Ohmae, Takashi; and Yoshida, Yasuyuki, 3,914,506.

Ohnishi, Fumio: *See—*
Takatsu, Mitsumune; Ohnishi, Fumio; and Minami, Junichi, 3,914,454.

Ohtsu, Takaji: *See—*
Matsushita, Takeshi; Horinaga, Hiroshi; Ohtsu, Takaji; and Hayashi, Hisao, 3,914,781.

Oka, Shunzo: *See—*
Nishioka, Matsuo; and Oka, Shunzo, 3,914,728.

Okamoto, Hiroshi, to TEAC Corporation. Reel motor control circuit in a tape recorder. 3,914,668, Cl. 318-7.000.

Okamoto, Yoshiyuki; Riker, Walter Franklin, Jr.; and Udenfriend, Sidney, to Hoffmann-La Roche Inc. Polymeric local anesthetic and antiarrhythmic agents. 3,914,283, Cl. 260-472.000.

Okonski, Edward. Safety runaway ski thong. 3,913,930, Cl. 280-11.35N.

Okuda, Hironori: *See—*
Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, 3,913,493.

Okuda, Seizi, to Nifco Inc. Squeeze-action clamp. 3,913,187, Cl. 24-255.000.

Oleck, Stephen M.: *See—*
Anderson, Conroy D.; Carlson, David W.; Oleck, Stephen M.; and Stover, William A., 3,914,377.

Olin Corporation: *See—*
Gavin, David F.; and Tobin, John H., 3,914,325.
Sawyer, Arthur W.; and Csejka, David A., 3,914,275.

Oliver, Don L., to Cities Service Oil Company. Automatic kelly bushing hold-down device. 3,913,352, Cl. 64-23.500.

Olivierse, Hendrik: *See—*
van Laar, Jacobus; Felthuis, Jacob; Weber, Hendrik Gustaaf Otto; and Olivierse, Hendrik, 3,913,617.

Olsen, Robert C., to Illinois Tool Works Inc. Multi container package and carrier. 3,913,738, Cl. 206-427.000.

Olsson, Nils O.; and Logue, Robert W., to International Harvester Company. Implement transport attachment. 3,913,683, Cl. 172-240.000.

Olstowski, Franciszek, to Dow Chemical Company, The. Rapid-setting polyurethanes. 3,914,198, Cl. 260-30.40N.

Olthoff, James Alan: *See—*
Casey, Thomas Patrick; Asal, Jerrold Ray; and Olthoff, James Alan, 3,913,684.

Olympus Optical Co., Ltd.: *See—*
Kawahara, Ichizo, 3,913,565.

O'Malley, Arthur S., to Hayes Albion Corporation. Cast aluminum textile beam. 3,913,863, Cl. 242-118.620.

O'Meara, David Moore: *See—*
Paccione, James Dennis; and O'Meara, David Moore, 3,913,500.

Omega Engineering, Inc.: *See—*
Hollander, Betty Ruth; Coppola, Theodore Anthony; and McKinley, William Earl, 3,914,008.

Omnium Technique d'Administration et de Gestion O.T.A.: *See—*
Facy, Leopold, 3,913,393.

O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased (by Childs, Patricia M., executrix), to Riverside Press, Inc. Voting machine. 3,914,577, Cl. 235-54.00A.

O'Neill, Charles Edward; Sridhar, Ramamritham; and Bell, Malcolm Charles Evert, to International Nickel Company, Inc., The. Reduction of nickel oxide. 3,914,124, Cl. 75-82.000.

O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Multifrequency tone detecting arrangement. 3,914,557, Cl. 179-84.0VF.

Onnagawa, Osamu: *See—*
Miyake, Akihisa; Kondo, Hisao; Nishidoi, Takashi; and Onnagawa, Osamu, 3,914,315.

Onoda, Yoshimitsu: *See—*
Kiwaki, Hisakatsu; Onoda, Yoshimitsu; and Ibamoto, Masahiko, 3,914,672.

Opderbeck, Rudolph G., to Wacker Corporation. Vibration generator. 3,913,409, Cl. 74-61.000.

Opravil, Egon, to Lumoprint Sindler KG. Copy sheet guidance device for photo-copying machines. 3,914,041, Cl. 355-3.00R.

Opseth, Stan J.: *See—*
Lunde, George G.; and Opseth, Stan J., 3,914,771.

Opti-Holding AG: *See—*
Deneke, Karlheinz; and Paas, Hans, 3,913,297.

Optical Coating Laboratory, Inc.: *See—*
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, 3,914,464.

Orchimed S.A.: *See—*
Mieville, Andre, 3,914,286.

O'Reilly, Thomas B.: *See—*
Messner, George A., 3,913,720.

Orescan, Michael. Band saw machine. 3,913,436, Cl. 83-409.000.

Orlandi, John V.: *See—*
Beckerman, Martin; Murphy, John A.; Orlandi, John V.; and Smith, George W., 3,914,000.

O'Rourke, Thomas Frank: *See—*
Coker, Charles Walter, Jr.; Hickox, Thomas A.; Lynott, John Joseph; and O'Rourke, Thomas Frank, 3,914,789.

Orr, Robert S.; and Fidler, Carl E., to Caterpillar Tractor Company. Seal protection guard. 3,913,985, Cl. 305-11.000.

Orsing, John Harry. Saliva ejector. 3,913,231, Cl. 32-33.000.

Osawa, Kenji: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 3,914,160.

Osipov, Anatoly Alexandrovich; and Pekov, Nikolai Semenovich. Device for preparing integrated microcircuits for printed wiring. 3,913,818, Cl. 228-3.100.

Ostapczuk, Edward W.: *See—*
Adams, Kenneth D.; Hauf, Robert C.; and Ostapczuk, Edward W., 3,913,506.

Osterholtz, Carl E.; Agostinelli, Edward; and Jagucki, Edward, to Wheeling-Pittsburgh Steel Corporation. Lining for zinc pot induction heater. 3,914,527, Cl. 13-30.000.

Ostler, David S.: *See—*
Holbrook, Legrand K.; and Ostler, David S., 3,913,780.

Ostrander, Robert K. Belt buckle and belt strap combination. 3,913,147, Cl. 2-325.000.

Oswitch, Stanley; Golownia, Robert F.; and Kipp, Kevin K., to Ferro Corporation. Rigid thermosetting load bearing compositions. 3,914,200, Cl. 260-40.000.

Otani, Shohei: *See—*
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, 3,914,448.

Otis Elevator Company: *See—*
Lovey, George Leslie, 3,913,757.

Otsuki, Susumu; and Miyanohara, Isao, to Rohm and Haas Company. Process for esterifying acrylic acid. 3,914,290, Cl. 260-486.00R.

Ott, Burkhard: *See—*
Ableitner, Erich; and Ott, Burkhard, 3,913,538.

Otte, Richard F., to Raychem Corporation. Thermally deformable fastening pin. 3,913,444, Cl. 85-8.300.

Otto, Robert J.: *See—*
Sinclair, Alex H.; and Otto, Robert J., 3,913,939.

Ounsted, Edwin J.: *See—*
Ernest, Robert P.; Ahrns, Daniel C.; Crowley, Thomas E.; and Ounsted, Edwin J., 3,913,198.

Outboard Marine Corporation: *See—*
Hale, Gordon B.; and Wlezien, Richard A., 3,913,693.

Over, Charles Edward; and Scott, Milford Melvin, to Kinematics Limited. Internal combustion engines. 3,913,322, Cl. 60-278.000.

Overall, Colin Douglas; and Washington, Derek, to U.S. Philips Corporation. Channel plate acting as discrete secondary-emissive dynodes. 3,914,634, Cl. 313-105.000.

Owens-Corning Fiberglas Corporation: *See—*
Belue, James C.; and Jones, Weston C., 3,914,477.
Poulsen, Peder Ulrik, 3,914,151.
Siefert, August C., 3,914,499.

Owens-Corning Fiberglass Corporation: *See—*
Flautt, Martin C.; Foley, Kevin M.; and Haines, Richard M., 3,914,192.

Owens-Illinois, Inc.: *See—*
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,914,152.
Bode, Wolfgang W.; and Fein, Michael E., 3,914,635.
Pirooz, Perry P., 3,914,517.
Slade, Woodrow W., 3,914,385.

Ozaki, Masahiko, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Device for holding heat insulating materials for double-shell low-temperature liquid storage tank. 3,913,775, Cl. 220-9.0LG.

Ozeroff, William John: *See—*
Caughlin, James Daniel; and Ozeroff, William John, 3,914,739.

P & D Manufacturing Co., Inc.: *See—*
Rutten, Donald E.; and Davis, Richard A., 3,913,528.

P K Products/Inc.: *See—*
Poister, Clarence E.; Tyrrell, Philip A.; and Hodge, Walter D., 3,913,150.

Paap, Hans J.; and Pitts, Robert W., Jr., to Texaco Inc. Neutron lifetime well logging methods and apparatus. 3,914,603, Cl. 250-270.000.

Paap, Karl-Ludwig: *See—*
Steinmetz, Hans-Joachim; Rahm, Helmut; and Paap, Karl-Ludwig, 3,914,746.

Paas, Hans: *See—*
Deneke, Karlheinz; and Paas, Hans, 3,913,297.

Paccar Inc.: *See—*
James, Larry Rodger, 3,913,700.

Paccione, James Dennis; and O'Meara, David Moore, to Chicago Bridge & Iron Company. Heat treatment of waste sludges. 3,913,500, Cl. 110-8.00F.

Pacific Fence and Wire Company: *See—*
Caldwell, Byron Lee, 3,913,558.

Packard, Norman M.; and Gaines, John W., to International Harvester Company. Ring manufacture, productive of face contact seal. 3,913,199, Cl. 29-156.600.

Pagani, Hermes; Coronelli, Carolina; Bardone, Maria Rosa; and Lancini, Giancarlo. Purpuromycin its derivatives and preparation thereof. 3,914,257, Cl. 260-343.20R.

Paige, Richard E., to Climax Manufacturing Co. Folding container and blank for making same. 3,913,824, Cl. 229-35.000.

Pall Corporation: *See—*
Cooper, Roydon B., 3,913,615.

Pallos, Ferenc M.; and Tseng, Chien K., to Stauffer Chemical Company. Certain geranyl phenyl ethers. 3,914,321, Cl. 260-612.00D.

Palma, James R. Archery bow tensioning device. 3,913,556, Cl. 124-30.00R.

Palmer-Shile Company: *See—*
Hall, Lee Z.; and Rowader, Richard B., 3,913,498.

Panchak, John R.: *See—*
Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,188.

Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,190.

Pandel-Bradford, Inc.: *See—*
Wisotzky, Reuben; and Petersen, Richard E., 3,914,492.

Panduit Corporation: *See—*
McSherry, William E., 3,913,876.

Panek, Joseph Conrad: *See—*
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, 3,914,743.

Pao, Henry C.; and Steiner, Stephen A., to Raytheon Company. T-T-L driver circuitry. 3,914,628, Cl. 307-270.000.

Paoli, Stephen A. Method and apparatus for removing skin from chicken necks. 3,913,174, Cl. 17-1.00G.

Papayoti, Hristo V., to Unistrut Corporation. Space frame connecting fixture. 3,914,063, Cl. 403-406.000.

Paptzun, George J., to Lunkenheimer Company, The. Butterfly valve. 3,913,610, Cl. 137-375.000.

Park, Im Keun, to Celanese Corporation. Pervious low density carbon fiber reinforced composite articles. 3,914,494, Cl. 428-247.000.

Park-Ohio Industries, Inc.: *See—*
Jensen, Fred C., 3,914,572.

Parker, Edward H.; Harris, Edward M.; and Meador, Jim D., to Western Litho Plate & Supply Co. Azido photopolymers. 3,914,261, Cl. 260-349.000.

Parker, George, Sr., to Trimble, J. B.; and Smith, Dwain, part interest to each. Method and apparatus for separating and collecting hydrocarbons in a volatile vapor mixture. 3,914,115, Cl. 55-32.000.

Parker, William J., to General Motors Corporation. Single inner assembly wave interference silencer. 3,913,703, Cl. 181-44.000.

Parkin, John C. Wheel washer. 3,913,162, Cl. 15-21.00C.

Parquet, Donald James, to Deere & Company. Hydrostatic transmission. 3,913,453, Cl. 91-420.000.

Pars, Harry G.; Granchelli, Felix E.; and Razdan, Raj K., to Arthur D. Little, Inc. 5H[1]benzopyrano-[3,4-c]piperidines. 3,914,237, Cl. 260-293.550.

Passarelli, Henry Andrew, Jr., to General Electric Company. Circuit for enabling safe actuation of a machine. 3,914,621, Cl. 307-113.000.

Patchett, Arthur A.; Mrozik, Helmut H.; and Hoff, Dale R., to Merck & Co., Inc. Methods of controlling liver fluke infections. 3,914,418, Cl. 424-230.000.

Patchornik, Abraham: *See—*
Gorecki, Marian; and Patchornik, Abraham, 3,914,205.

Patent Development Pty. Limited: *See—*
Hall, Marshall John, 3,913,284.

Paterson, Thomas G., to Pullman Incorporated. Railway car door control mechanism. 3,913,268, Cl. 49-220.000.

Patience, Brian Michael: *See—*
Mason, Frederick Percival, deceased; and Patience, Brian Michael, 3,914,682.

Paton, Robert Michael: *See—*
Rennie, Robert Allan Campbell; Crosby, John; and Paton, Robert Michael, 3,914,267.

Pattershall, Howard F. Sealing groove cover for paint container or the like. 3,913,785, Cl. 220-354.000.

Pauliukonis, Richard S. Momentary contact valve. 3,913,620, Cl. 137-625.640.

Pauly, Peter Daniel: *See—*
Rudner, Bernard; and Pauly, Peter Daniel, 3,914,189.

Paupy, Jean Pierre, to U.S. Philips Corporation. Starter for an electric discharge lamp. 3,914,646, Cl. 315-103.000.

Pavey, Robert L., to Swift & Company. Intermediate moisture formulated foods and process. 3,914,445, Cl. 426-326.000.

Pavone, Harry: *See—*
Barron, George E.; and Pavone, Harry, 3,913,756.

Pearce, Richard J.: *See—*
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,753.
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., 3,913,754.

Pedone, Vito S. Small boat oil removal system for bilge water. 3,913,513, Cl. 114-183.00R.

Pekov, Nikolai Semenovich: *See—*
Osipov, Anatoly Alexandrovich; and Pekov, Nikolai Semenovich, 3,913,818.

Pelabon, Andre E., to ANF-Frangeco, S.A. Railway car bogie suspension system. 3,913,495, Cl. 105-199.00R.

Penn, William H., Jr.: *See—*
Hart, John E.; Penn, William H., Jr.; and Tuss, John J., 3,913,412.

Pensack, Joseph Michael: *See—*
Wilbur, Robert Daniel; and Pensack, Joseph Michael, 3,914,428.

Periphonics Corporation: *See—*
Barnes, Elwood Eugene; Emerson, Sidney Thomas; Rogers, Paul Clifton; and Simpson, Wilburn Dwain, 3,914,747.

Perkinson, Leon R.: *See—*
Moore, Francis C.; Perkinson, Leon R.; and Brown, Billy E., 3,913,562.

Peronnet, Jean: *See—*
Hanff, Michel; Lions, Noel; and Peronnet, Jean, 3,913,407.

Perotti, Andre: *See—*
Kohler, Fritz; and Perotti, Andre, 3,913,354.

Peroxid-Chemie GmbH: *See—*
Dillenburg, Helmut; Honig, Helmut; and Fuchs, Paul-Wilhelm, 3,914,380.

Perreault, Arthur W.: *See—*
Servadio, Gildo J.; Perreault, Arthur W.; and Jones, John C., 3,914,442.

Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, to Xerox Corporation. Facsimile communication system. 3,914,537, Cl. 178-6.000.

Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, to Xerox Corporation. Facsimile communication system. 3,914,538, Cl. 178-6.000.

Persicke, Gunter, to Road Research Limited. Shock or energy absorbing apparatus. 3,913,963, Cl. 293-15.000.

Personal Products Company: *See—*
Ginocchio, James A., 3,913,580.
Srinivasan, Subramani; and Sivilich, Daniel M., 3,913,579.

Perucca, Giovanni: *See—*
Melindo, Flavio; and Perucca, Giovanni, 3,914,553.

Peter, Roger: *See—*
Turner, Lawrence Alexander; and Peter, Roger, 3,913,334.

Peters, Arnis E., to Gelatt Investments, Inc. Lap model microfilm viewer. 3,914,037, Cl. 353-26.000.

Petersen, Arthur W.: *See—*
Schoenholz, Daniel; Petersen, Arthur W.; and Hirschberger, Leonard, 3,914,197.

Petersen, Richard E.: *See—*
Wisotzky, Reuben; and Petersen, Richard E., 3,914,492.

Peterson, Donald E. Hamburger patty forming machine. 3,913,175, Cl. 17-32.000.

Peterson, Everett A. Coin display page. 3,913,732, Cl. 206-.830.

Peterson, Kenneth Alan. Tennis racket with head frame weighting means. 3,913,911, Cl. 273-73.00C.

Peterson, William Anders, to Bell Telephone Laboratories, Incorporated. Sampling circuit. 3,914,626, Cl. 307-235.00B.

Petrovic, John E., to Graco Inc. Safety spray gun trigger. 3,913,844, Cl. 239-526.000.

Petrovich, Arlene I.: *See—*
Richards, George, deceased; Hadley, Vivian L.; and Petrovich, Arlene I., 3,913,172.

Pettibone Corporation: *See—*
Carriere, Russell F., 3,913,767.

Petty-Ray Geophysical, Inc.: *See—*
Hoover, Michael C.; and Long, William C., 3,914,601.

Petty, Walter L., to Shell Oil Company. Difluoroamino polyethers. 3,914,209, Cl. 260-88.30A.

Pezzolo, Donald E., to Fairchild Camera and Instrument Corporation. Latch circuit with noise suppression. 3,914,622, Cl. 307-288.000.

Pfeffer & Son: *See—*
McPhail, Joe L., 3,914,449.

Pfefferle, William C., to Engelhard Minerals & Chemicals Corporation. Method and furnace apparatus. 3,914,090, Cl. 431-9.000.

Pfeiffer, Heinrich, to Maschinenfabrik J. Dieffenbacher & Co. Method and device for the production of layered pressed panels. 3,914,154, Cl. 156-557.000.

Pfeiffer, Robert C.: *See—*
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,861.
Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, 3,913,862.

Pfizer Inc.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 3,914,218.
Cronin, Timothy H.; and Hess, Hans-Jurgen E., 3,914,423.
Evanega, George R.; Kuhla, Donald E.; and Sarges, Reinhard, 3,914,426.

Pfleger, Frank: *See—*
Howland, Howard; and Pfleger, Frank, 3,913,477.

Pflipsen, Dieter: *See—*
Hoffken, Erich; Pflipsen, Dieter; and Trenkler, Hansjorg, 3,913,950.

Pharmacare, Inc.: *See—*
Siegel, Harold B., 3,913,734.

Pharmacia Fine Chemicals AB: *See—*
Johansson, Haldor Ingemar; Lundgren, Helga Katarina; and Joustra, Marius Klaus, 3,914,183.

Phillips Petroleum Company: *See—*
Hill, Harold Wayne, Jr.; and Campbell, Robert W., 3,914,150.
McClure, Herman W., 3,913,854.
Wilson, Newton R., 3,914,366.
Windle, Tom J., 3,913,234.

Piazza, Carmelo, to Mel Optics Company. Applanation tonometer. 3,913,390, Cl. 73-80.000.

Picker Corporation: *See—*
Martone, Ronald J.; Goldman, Samuel C.; and Dewhirst, Roy, 3,914,614.

Pierce, Robert B.: *See—*
Mintz, Gary; Mintz, S. Stanley; and Pierce, Robert B., 3,913,973.

Pieri, Giovanni: *See—*
Bedetti, Gianfranco; Pieri, Giovanni; Ducato, Aldo; and Held, Llewellyn John, 3,914,396.

Pierre Mariotte S.A.: *See—*
Bletry, Pierre C.; and David, Bernard E., 3,914,474.

Piesch, Steffen: *See—*
Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, 3,914,523.

Pietras, Edward F.; and Nelson, Elric J., to United States of America, Navy. Wave energy translator. 3,914,584, Cl. 235-150.200.

Pike, Charles T.; and Itzken, Irving, to Jersey Nuclear-Avco Isotopes, Inc. Apparatus for lengthening laser output pulse duration. 3,914,709, Cl. 331-94.500.

Pike, John E., to Upjohn Company, The. Prostaglandin E_1, F_1, and A_1 analogs. 3,914,282, Cl. 260-468.00D.

Pilkington Brothers Limited: *See—*
Brooke, Peter Howard; Dickinson, Ian James; Kavanagh, David Cecil; and Smith, Colin, 3,914,118.

Pilkington, Mary W.: *See—*
Berni, Ralph J.; Benerito, Ruth R.; and Pilkington, Mary W., 3,914,108.

Pimiskern, Klaus: *See—*
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,902.
Hepp, Wolfgang; Pimiskern, Klaus; and Herbert, Werner, 3,913,991.

Pinczewski, Morris: *See—*
Barrett, Edward E.; and Pinczewski, Morris, 3,913,817.

Pines, Seemon H., to Merck & Co., Inc. Process for preparing 4-methylsulfinylbenzaldehyde. 3,914,318, Cl. 260-599.000.

Ping, David T.: *See—*
Gee, James E.; Sieving, Alfred W.; and Ping, David T., 3,913,948.

Pinsler, Heinz W., to Xerox Corporation. Nickel oxide interlayers for photoconductive elements. 3,914,126, Cl. 96-1.500.

Pioneer Electronic Corporation: *See—*
Muraoka, Hiroshi; Narui, Michinori; and Sugiyama, Keiji, 3,913,221.

Pirie, James E. Materials handling container. 3,913,741, Cl. 206-508.000.

Pirooz, Perry P., to Owens-Illinois, Inc. Method of forming a conductively coated crystalline glass article and product produced thereby. 3,914,517, Cl. 428-433.000.

Pirson, Ewald: *See—*
Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, 3,914,476.

Pitcher, Ethel J., administratrix: *See—*
Pitcher, Kenneth R., deceased, 3,913,554.

Pitcher, Kenneth R., deceased (by Pitcher, Ethel J., administratrix), to Healthways. Air operated gun. 3,913,554, Cl. 124-15.000.

Pitt, Harold M.; Zeleny, Richard A.; and Knoshaug, Wendell E., to Stauffer Chemical Company. Method of esterification of alkyl phosphonothio dihalides. 3,914,346, Cl. 260-973.000.

Pitt, Harold Mahonrai: *See—*
Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, 3,914,302.

Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., to International Flavors & Fragrances Inc. Certain cycloalkyl pyrazinyl ketones. 3,914,227, Cl. 260-250.00B.

Pittet, Alan O.: *See—*
Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, 3,914,451.

Pitts, Robert W., Jr.: *See—*
Paap, Hans J.; and Pitts, Robert W., Jr., 3,914,603.

Pivar, Stuart, to Rototron Corporation. Multiple piece mold apparatus and method to manufacture hollow articles. 3,914,105, Cl. 425-435.000.

Plancher, Luisa; and Spector, George. Vertically adjustable chair. 3,913,976, Cl. 297-345.000.

Plocek, Frank C. Shrimp tank. 3,913,525, Cl. 119-2.000.

Pneumeric Corporation: *See—*
Hawley, Jack S., 3,913,457.

Pogson, John T.: *See—*
Franklin, James L.; and Pogson, John T., 3,913,665.

Pohlemann, Heinz: *See—*
Naarmann, Herbert; and Pohlemann, Heinz, 3,914,329.

Poister, Clarence E.; Tyrrell, Philip A.; and Hodge, Walter D., to P K Products/Inc. Toilet stool ventilating means. 3,913,150, Cl. 4-213.000.

Polaroid Corporation: *See—*
Bedell, Stanley F.; and Taylor, Lloyd D., 3,914,017.
Slavitter, Frederick, 3,914,777.

Pollmeier, Konrad, to Durkoppwerke GmbH. Workpiece guide for sewing machine. 3,913,507, Cl. 112-153.000.

Pollock, John S., to Eastman Kodak Company. Combination specular-diffuse projection device and method. 3,914,721, Cl. 355-35.000.

Polsky, Lawrence M.: *See—*
Auer, John H., Jr.; and Polsky, Lawrence M., 3,913,491.

Ponsaing, Per: *See—*
Munster, Ebbe; and Ponsaing, Per, 3,914,742.

Popelak, Alfred: *See—*
Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, 3,914,219.

Popovic, Dragan: *See—*
Muller, Ernst; and Popovic, Dragan, 3,913,965.

Porter, Donald C., to Airko Manufacturing Company. Wood cutting apparatus. 3,913,642, Cl. 144-114.00R.

Portnoy, Norman A.; Reine, Alden H.; and Arthur, Jett C., Jr., to United States of America, Agriculture. Cotton-oxime, cotton-semicarbazone, and cotton-hydantoin-textile products of high nitrogen content. 3,914,109, Cl. 8-194.000.

Portwood, Owen, Jr.: *See—*
Starks, Charles M.; and Portwood, Owen, Jr., 3,914,272.

Post, Lloyd D.: *See—*
Kosonocky, Stephan; and Post, Lloyd D., 3,913,486.

Post Office, The: *See—*
Bone, Clive, 3,914,004.

Pott, Richard, to Stahlgruber Otto Gruber & Co. Wiping device for a conveyor belt. 3,913,728, Cl. 198-230.000.

Potthast, Ernst W. Intraocular lens apparatus. 3,913,148, Cl. 3-13.000.

Potts, John D.: *See—*
Kirsch, Francis William; Barmby, David S.; and Potts, John D., 3,914,383.

Poulsen, Peder Ulrik, to Owens-Corning Fiberglas Corporation. Mandrel for the production of reinforced plastic tubing. 3,914,151, Cl. 156-425.000.

Powell, Harry C., Jr., to Powell Machinery, Inc. Fruit delivery, weighing, and bagging apparatus. 3,913,691, Cl. 177-202.000.

Powell Machinery, Inc.: *See—*
Powell, Harry C., Jr., 3,913,691.

Powell, Noble R.: *See—*
Irwin, John M.; and Powell, Noble R., 3,914,590.

Powell, Walter W.: *See—*
Greenwood, Marvin H.; and Powell, Walter W., 3,913,885.

Power-Matic Corporation: *See—*
Gogins, Laird B., 3,913,698.

PPG Industries, Inc.: *See—*
Baker, John G., 3,914,336.

Prasad, Raj Nandan: *See—*
Stein, Herman Hal; and Prasad, Raj Nandan, 3,914,414.
Stein, Herman Hal; and Prasad, Raj Nandan, 3,914,415.

Pray, Winston C., to Flexible Steel Lacing Company. Riveting system and nail and rivet assembly therefor. 3,913,180, Cl. 24-31.00B.

Precision Thin Film Corporation: *See—*
Berg, Joseph E.; and Brown, Randolph E., Jr., 3,913,520.

Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, to Siemens Aktiengesellschaft. Production of electrical components, particularly RC networks. 3,913,224, Cl. 29-625.000.

Premyslovsky, Jiri: *See—*
Bayer, Oldrich; Snasel, Josef; and Premyslovsky, Jiri, 3,913,466.

Prescott, Dale B. Fastening device for interlocking panels. 3,913,288, Cl. 52-127.000.

President of Nagoya Institute of Technology, Kokichi Sano: *See—*
Arai, Toshimasa, 3,914,083.

Price, John H., to Hudson Oxygen Therapy Sales Company. Oxygen dilution apparatus. 3,913,607, Cl. 137-271.000.

Price-Pfister Brass Mfg. Co.: *See—*
Tolnai, Julius L., 3,913,612.

Priestley, Ronald: *See—*
McKeown, Kevin Joseph; Ellis, Stephen Robert Mercer; and Priestley, Ronald, 3,914,351.

Priestley, Terence Patrick; and Garside, John Duncan, to Loughborough University of Technology, The. Hydraulic actuator. 3,913,448, Cl. 91-36.000.

Priluck, David Manuel, to General Electric Company. Turbine overspeed control system. 3,913,329, Cl. 60-660.000.

Primessing, Franz: *See—*
Wienand, Michael; Jensen, Klaus; Primessing, Franz; and Alfter, Franz-Werner, 3,914,147.

Prince, Richard B.: *See—*
Scales, Stanley R.; and Prince, Richard B., 3,913,988.

Prior, James C., to Sola Basic Industries, Inc. Key operated switch. 3,914,563, Cl. 200-42.00T.

Probst, Richard O.; and Kendall, Ronald R., to Ransburg Electro-Coating Corporation. Powder coating apparatus. 3,913,523, Cl. 118-626.000.

Proctor, Albert Edward, to Flaregas Engineering Limited. Combustion apparatus. 3,914,093, Cl. 431-89.000.

Proner, Raymond Louis; and Bourgoin, Rene Leon Clement, to Societe Anonyme: Ciments LaFarge. Method and apparatus for homogenizing, stockpiling and sampling particulate materials. 3,913,761, Cl. 214-152.000.

Pull, Heino L.; and Rezabek, Paul F., Jr., to United States of America, Air Force. Cabinet closure system. 3,913,997, Cl. 312-223.000.

Pullman Incorporated: *See—*
Knippel, Willis H.; and Marulic, Walter J., 3,913,267.
Paterson, Thomas G., 3,913,268.

Pulp and Paper Research Institute of Canada: *See—*
Mueller, Walter A., 3,914,397.

Purdom, Clyde H.; Allum, Kenneth W.; and Shackelford, Harold D., to Cleo Wrap Corporation. Packaging machine. 3,913,731, Cl. 198-261.000.

Puretic, Mario J. Fish handling device. 3,913,254, Cl. 43-6.500.

Purex Corporation: *See—*
Maxey, Eugene R., 3,914,592.

Purolator, Inc.: *See—*
Torres, Jorge, 3,913,603.

Puyhaubert, Jean; and Seguin, Michel, to Societe Lignes Telegraphiques et Telephoniques. Long-delay electroacoustic line. 3,914,718, Cl. 333-30.00R.

PVO International Inc.: *See—*
Nahta, Roop; Bernholz, William F.; Redston, John Percy; and Warman, Murray, 3,914,177.

Pye Limited: *See—*
Hutchings, Bernard David Francis; and Hubbard, Robert William, 3,913,690.

Pyle, Wayne E.; and Doucette, Robert J., to Questech, Inc. Apparatus for making electrical wiring harnesses. 3,913,202, Cl. 29-203.0MW.

Qonaar Corporation: *See—*
Collins, Terence John, 3,913,717.
Zajac, Bruno G., 3,913,718.

Quakenbush, Howard M., to Flexsteel Industries, Inc. Convertible seat-bed. 3,913,152, Cl. 5-37.00R.
Quaker Oats Company, The: *See—*
Doe, Walter P., 3,913,261.
Qualitrol Corporation: *See—*
Johnson, Wendell D., 3,914,528.
Quebec Iron & Titanium Corporation-Fer et Titane du Quebec, Inc.: *See—*
Chiu, Shiu Tang, 3,914,113.
Questech, Inc.: *See—*
Pyle, Wayne E.; and Doucette, Robert J., 3,913,202.
Quick Point Pencil Co., Inc.: *See—*
Goessling, John G.; and Lage, David P., 3,913,362.
Quinn, Alton Dewitt: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.
Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, 3,914,451.
Raasch, Hans, to W. Schlafhorst & Co., Maschinenfabrik. Automatic winding machine. 3,913,853, Cl. 242-35.50R.
Rabe, Herbert H.: *See—*
Knott, Martin J.; Lewis, Lloyd G.; and Rabe, Herbert H., 3,914,681.
Radcliff, Frank Taylor: *See—*
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Vorwerk, Richard, 3,913,452.
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Ranger, Eugene, 3,913,752.
Raech, Harry, Jr.: *See—*
Lubowitz, Hyman R.; and Raech, Harry, Jr., 3,914,334.
Ragutsky, Arnold Mikhailovich: *See—*
Kostjunin, Boris Nikolaevich; Zadvorny, Alfred Fedorovich; Ragutsky, Arnold Mikhailovich; and Starichnev, Vladimir Viktorovich, 3,913,613.
Rahm, Helmut: *See—*
Steinmetz, Hans-Joachim; Rahm, Helmut; and Paap, Karl-Ludwig, 3,914,746.
Rahn, Paul: *See—*
Esser, Paul; Mayer, Emil; and Rahn, Paul, 3,913,374.
Rai-Choudhury, Prosenjit, to Westinghouse Electric Corporation. Method of making semiconductor devices by single step diffusion. 3,914,138, Cl. 148-186.000.
Raiford, Morgan B.; Reeves, Charles R.; and Ingle, Harold R., Jr. Method and apparatus for making integrated multifocal lenses. 3,913,274, Cl. 51-58.000.
Rajagopalan, Parthasarathi, to Endo Laboratories. Pyridopyrrolobenzheterocycles for combatting depression. 3,914,421, Cl. 424-248.000.
Rajay Industries, Inc.: *See—*
Uitti, Paul M.; and Mastin, William H., Jr., 3,913,542.
Rakestraw, Thomas L.: *See—*
Augustin, Eugene H.; Johnson, Roger E.; and Rakestraw, Thomas L., 3,913,812.
Ram, Michael J.; and Di Edwardo, Andrew H., to Celanese Corporation. Process for the conversion of stabilized acrylic fibers to carbon fibers. 3,914,393, Cl. 423-447.000.
Ramon, Casimiro Manuel Carreras. Upholstery material. 3,913,509, Cl. 112-408.000.
Ramsey, Keith E., to Knickerbocker Company, The. Lift truck load lifting mechanism. 3,913,765, Cl. 214-701.00P.
Randall, Robert E., to Rowland Products, Inc. Method for producing multicolor patterns in synthetic plastic sheet material. 3,914,362, Cl. 264-75.000.
Ranger, Eugene: *See—*
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Ranger, Eugene, 3,913,752.
Rank Xerox, Ltd.: *See—*
Fukushima, Osamu; Sato, Masamichi; and Matsumoto, Seiji, 3,913,524.
Ransburg Electro-Coating Corporation: *See—*
Probst, Richard O.; and Kendall, Ronald R., 3,913,523.
Rao, V. Durga Nageswar, to Ford Motor Company. Seal construction for a rotary ceramic regenerator for use in a gas turbine engine. 3,913,926, Cl. 277-96.000.
Rappaport, Marshall A.: *See—*
Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., 3,913,827.
Raseman, Chad J.: *See—*
Delano, Richard; and Raseman, Chad J., 3,914,469.
Ravenhill, John Richard: *See—*
Finney, David John; Ravenhill, John Richard; and Tait, Malcolm John, 3,914,441.
Ray, Clarence R.; and La Brie, Jack A., to Van Leer Plastics (U.S.A.) Inc. Plastic tie down clip. 3,913,186, Cl. 24-245.00R.
Raychem Corporation: *See—*
Bedard, Ronald L.; Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., 3,914,363.
Dahl, Klaus J., 3,914,298.
Otte, Richard F., 3,913,444.
Raymond Lee Organization: *See—*
McGillicuddy, John R., 3,913,935.
Raymond Lee Organization Inc: *See—*
Seyk, Ronald F., 3,914,756.
Raymond Lee Organization Inc.: *See—*
Colgan, Francis L., 3,913,257.
Shaver, Douglas W., 3,913,551.
Raytheon Company: *See—*
Pao, Henry C.; and Steiner, Stephen A., 3,914,628.
Stout, Karl J., 3,914,611.
Razdan, Raj K.: *See—*
Pars, Harry G.; Granchelli, Felix E.; and Razdan, Raj K., 3,914,237.
RCA Corporation: *See—*
Boltz, Charles D., Jr., 3,914,542.
Carlson, Curtis Raymond; Gorog, Istvan; and Heyman, Philip Michael, 3,914,711.
Childers, Billy M.; and Fesperman, Charles D., Jr., 3,913,359.
Craft, Jack, 3,914,704.
Evans, Wayne Wheeler, 3,914,696.
Forster, Gerhard; and Keller, Hans, 3,914,653.
Gehweiler, William Frederick, 3,914,702.
Kane, James; and Schweizer, Hanspeter, 3,914,515.
Klensch, Richard Joseph, 3,914,762.
Kressel, Henry, 3,914,136.
Leidich, Arthur John, 3,914,684.
Reader, Paul D.; and Kaufman, Harold R., to Ion Tech, Inc. Electron-bombardment ion sources. 3,913,320, Cl. 60-202.000.
Recker, Bodo. Connecting device for panel-shaped members. 3,913,289, Cl. 52-285.000.
Rectilinear Research Corporation: *See—*
Wiener, Morris I., 3,913,877.
Red, Richard W., Jr., to Browning-Ferris Industries, Inc. Apparatus for loading flowable material. 3,913,806, Cl. 222-429.000.
Redford, David Arthur; and Allen, Joseph Columbus, to Texaco Inc.; and Texaco Exploration Canada. Recovery of petroleum from viscous petroleum containing formations including tar sand deposits. 3,913,671, Cl. 166-252.000.
Redford, David Arthur: *See—*
Allen, Joseph Columbus; and Redford, David Arthur, 3,913,672.
Redman, Charles M., to United States of America, Army. Electron image integration intensifier tube. 3,914,600, Cl. 250-213.0VT.
Redston, John Percy: *See—*
Nahta, Roop; Bernholz, William F.; Redston, John Percy; and Warman, Murray, 3,914,177.
Reed, Ronald H.; and Diersing, Raymond A., to Square D Company. Automatic by-pass device for a watt hour meter socket. 3,914,564, Cl. 200-51.100.
Reeves, Charles R.: *See—*
Raiford, Morgan B.; Reeves, Charles R.; and Ingle, Harold R., Jr., 3,913,274.
Regie Nationale Des Usines Renault: *See—*
Andreux, Bernard, 3,913,781.
Chatourel, Pierre, 3,913,659.
Reid, Ernest A. Door hinge pin mounted adjustable door stop. 3,913,171, Cl. 16-82.000.
Reinberg, Alan R.: *See—*
Buss, Dennis D.; and Reinberg, Alan R., 3,914,127.
Reine, Alden H.: *See—*
Portnoy, Norman A.; Reine, Alden H.; and Arthur, Jett C., Jr., 3,914,109.
Reinhardt, Thomas A.: *See—*
Baldwin, Arlen R.; and Reinhardt, Thomas A., 3,914,133.
Reinmiller, Elmer E.: *See—*
Lale, Walter G.; and Reinmiller, Elmer E., 3,913,807.
Reinnagel, Richard E., to United States of America, Army. Liquid motion anti-disturbance switch. 3,914,567, Cl. 200-61.470.
Reis, Robert D., to United Electric Controls Company. Temperature control recorder. 3,914,770, Cl. 346-17.000.
Remane, Roger, to Application Des'Gaz. Head for connection to replaceable gas cartridge. 3,913,609, Cl. 137-322.000.
Remmington, Timothy Alan: *See—*
Cobb, Leslie Hamilton; Mann, David; and Remmington, Timothy Alan, 3,914,471.
Rennie, Robert Allan Campbell; Crosby, John; and Paton, Robert Michael, to Imperial Chemical Industries Limited. Production of isocyanates by thermal decomposition of aromatic hydroxamic acid halides. 3,914,267, Cl. 260-453.00P.
Republic Steel Corporation: *See—*
Markarian, Kegham M.; Matty, Richard D.; Maloney, Thomas W.; and Moore, Thomas E., 3,914,526.
Research Corporation: *See—*
Muxfeldt, Hans H., 3,914,299.
Resh, Mark: *See—*
Coberley, Daniel A.; and Resh, Mark, 3,914,582.
Respiratory Care, Inc.: *See—*
Cambio, Orlando D., Jr., 3,913,843.
Restaurant Technology, Inc.: *See—*
Brill, Frank D.; and Weimer, Ralph E., 3,913,792.
Reynolds, Lester A. Boat anchor retrieving method and apparatus. 3,913,514, Cl. 114-206.00R.
Reynolds Metals Company: *See—*
Nelson, Warren J.; and Fauth, Donald A., 3,914,001.
Rezabek, Paul F., Jr.: *See—*
Pull, Heino L.; and Rezabek, Paul F., Jr., 3,913,997.
Rhee, Jhoon Goo. Tie straps. 3,913,179, Cl. 24-16.0PB.
Rhone-Poulenc Industries: *See—*
Billet, Lucien; and Jouffret, Michel, 3,914,291.
Rhone-Poulenc, S.A.: *See—*
Brunie, Jean Claude; Costantini, Michel; Crenne, Noel; and Jouffret, Michel, 3,914,292.
Ducloux, Maurice; and Gruffax, Max, 3,914,505.

Ribich, William A.; and Russell, David B., to American Velcro, Inc. Method of making a fastening device by spin welding. 3,914,144, Cl. 156-73.500.

Richard, Charles A.: *See—*
Barbee, John P., Jr.; and Richard, Charles A., 3,913,676.

Richard, Henri. Fuel heating system for an internal combustion engine. 3,913,543, Cl. 123-122.00H.

Richards, Basil James; and Adams, Roger Anthony, to New Century Novelty Company PTY. Ltd. Position sensing device for a rotatable game reel. 3,913,922, Cl. 273-143.00R.

Richards, George, deceased; by Hadley, Vivian L.; and by Petrovich, Arlene I. Detachable hand-grip for shopping bags. 3,913,172, Cl. 16-114.00B.

Richards, Gerald F.: *See—*
Blake, Nathan L.; and Richards, Gerald F., 3,913,303.

Richards, Peter Henry, to Triplex Safety Glass Company Limited. Tongs for suspending glass. 3,913,966, Cl. 294-118.000.

Richards, William D., to American Optical Corporation. Slow-speed tape recorder drive mechanism. 3,913,869, Cl. 242-206.000.

Richey, Clarence B. Method of farming. 3,913,502, Cl. 111-1.000.

Richter, Johan Christoffer Frederik Carl, to Xerox Corporation. Clog-proof liquid distribution device. 3,913,838, Cl. 239-225.000.

Rickard, Robert S.: *See—*
Clark, Franklin F.; and Rickard, Robert S., 3,914,375.
Koehler, Harold; Zundel, Weldon P.; and Rickard, Robert S., 3,914,374.

Ricoh Co., Ltd.: *See—*
Hashimoto, Takemi, 3,914,539.

Rife, David Charles: *See—*
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, 3,914,743.

Rigalt, Gonzalo. Brake failure warning device. 3,914,734, Cl. 340-52.00A.

Righi, Franco: *See—*
Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, 3,914,313.

Riken Kiki Kabushiki Kaisha: *See—*
Matsui, Tokio; and Katayama, Tateo, 3,913,952.

Riken Seiki Kabushiki Kaisha: *See—*
Matsui, Tokio; and Katayama, Tateo, 3,913,952.

Riker, Walter Franklin, Jr.: *See—*
Okamoto, Yoshiyuki; Riker, Walter Franklin, Jr.; and Udenfriend, Sidney, 3,914,283.

Rilsan Corporation: *See—*
Koch, Robert B., 3,914,146.

Rippel, Riemond Henry: *See—*
Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, 3,914,412.

Ristow, Dietrich: *See—*
Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, 3,913,224.

Ritson, Carl; and Thomas, Ernest Hilton, to Spembly Limited. Cryogenic apparatus. 3,913,581, Cl. 128-303.100.

Ritter, Elmar, to Balzers Patent und Beteiligungs AG. Sun protection glass. 3,914,516, Cl. 428-432.000.

Rivers, Roy Wilben: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.

Riverside Press, Inc.: *See—*
O'Neal, Cothburn M.; Mayo, Alfred M.; and Childs, George William, deceased, 3,914,577.

Road Research Limited: *See—*
Persicke, Gunter, 3,913,963.

Robbins, Daniel H. Graphic printer. 3,914,048, Cl. 355-66.000.

Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, to Anheuser-Busch, Incorporated. Concentrated extract of yeast and processes of making same. 3,914,450, Cl. 426-533.000.

Robert Bosch GmbH: *See—*
Bosch, Paul, 3,913,456.
Lapple, Egon; and Schmidt, Peter, 3,913,536.
Ziesche, Kurt; and Kulke, Gunter, 3,913,537.

Robert Bosch Photokino GmbH: *See—*
Fabro, Roberto; and Tolone, Roberto, 3,913,865.

Roberts-Gordon Appliance Corporation: *See—*
Huyck, Robert T., 3,914,088.

Robertshaw Controls Company: *See—*
Manecke, Siegfried E.; and Shaw, James L., 3,914,661.
Morris, Louis P., 3,913,846.
Stearley, John W., 3,914,660.

Robinson, William P.: *See—*
Trbovich, Nicholas D.; Robinson, William P.; and Trunzo, Eugene R., 3,913,913.

Roche, Edward Noland. Router mitering-guide. 3,913,447, Cl. 90-12.00D.

Rock, Erich; and Mages, Bernhard, to Blum Gesellschaft m.b.H. Hinge device. 3,913,173, Cl. 16-130.000.

Rockwell International Corporation: *See—*
Ehman, Michael F., 3,914,525.
Haines, Ralph W., 3,914,587.
Ohlen, Gilbert M., 3,914,693.
Sarring, Ernest J., 3,913,750.
Watson, George A.; and Bollinger, John J., 3,914,580.

Roesch, Egon: *See—*
Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, 3,914,219.

Roger, Jean Claude: *See—*
Schaffner, Karl; Meisels, Alex; Roger, Jean Claude; and Weis, Claus D., 3,914,222.

Rogers, Paul Clifton: *See—*
Barnes, Elwood Eugene; Emerson, Sidney Thomas; Rogers, Paul Clifton; and Simpson, Wilburn Dwain, 3,914,747.

Rohm GmbH: *See—*
Krieg, Manfred; Suetterlin, Norbert; and Blitz, Hans-Dieter, 3,914,338.

Rohm and Haas Company: *See—*
Mercurio, Andrew; and Sperry, Peter R., 3,914,463.
Miller, George A.; Lewis, Sheldon N.; and Weiler, Ernest D., 3,914,301.
Otsuki, Susumu; and Miyanohara, Isao, 3,914,290.
Seidel, Michael C.; Von Meyer, William C.; and Greenfield, Stanley E., 3,914,223.

Rohr Plessey Corporation: *See—*
Gray, Wallie P., 3,913,726.

Rohrer, Jean: *See—*
Heimlicher, Paul; Rohrer, Jean; and Scharer, Willy, 3,913,855.
Muster, Hansruedi; and Rohrer, Jean, 3,913,900.

Roland Offsetmaschinenfabrik Faber & Schleicher AG: *See—*
Cappel, Bert; Schuhmann, Siegfried; and Wolf, Klaus, 3,913,479.

Rolfe, Alfred H., to Automatic Switch Company. Variable bleed valve. 3,913,884, Cl. 251-35.000.

Rolls-Royce (1971) Limited: *See—*
Fox, Roger Geoffrey; and Cox, Vernon Frederick, 3,913,318.
McMurtry, David Roberts, 3,913,626.
Snell, Leonard Stanley, 3,913,321.

Romanowicz, Karl J., Jr. Spark plug center. 3,913,273, Cl. 51-8.0SP.

Root, Bernard H.: *See—*
Comas, Enrique G.; and Root, Bernard H., 3,914,555.

Rosen, Irving: *See—*
Giddings, Brandford E.; and Rosen, Irving, 3,914,337.

Rosenberg, Larry. Coherent radiation beam coupler. 3,914,013, Cl. 350-96.00B.

Rosenberg, Robert L.; and Schmidt, Ronald Vernon, to Bell Telephone Laboratories, Incorporated. Surface wave tubular acoustic delay line. 3,914,717, Cl. 333-30.00R.

Rosenberger, Siegfried: *See—*
Schwarzenbach, Kurt; and Rosenberger, Siegfried, 3,914,344.

Rosenthal, Rudolph; and Bonetti, Giovanni A., to Atlantic Richfield Company. Catalytic oxidation of hydrocarbons with organic hydroperoxides. 3,914,295, Cl. 260-524.00M.

Rosier, Laurence L.: *See—*
Keefe, George E.; Lin, Yeong S.; and Rosier, Laurence L., 3,914,751.

Ross, Irving D., Jr., to Youngstown Steel Door Company. Safety cranks for plug doors. 3,913,269, Cl. 49-220.000.

Ross, Wesley J.: *See—*
Canale, Raymond P.; and Ross, Wesley J., 3,913,316.

Rossborough Manufacturing Co.: *See—*
Boron, Joseph J., 3,913,404.

Rossi, Alberto: *See—*
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 3,914,212.

Roth, Charles T.: *See—*
Hamaker, Ralph A.; and Roth, Charles T., 3,914,546.

Roth, Michael: *See—*
Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, 3,914,476.

Rother, Klaus Dieter, to Siemens Aktiengesellschaft. Circuit arrangement for multiple frequency code character receivers in telecommunication systems. 3,914,558, Cl. 179-84.0VF.

Rototron Corporation: *See—*
Pivar, Stuart, 3,914,105.

Roukis, John G.; Kosson, Robert L.; and Westell, John R., to Grumman Aerospace Corporation. Self-filling arterial heat pipe. 3,913,664, Cl. 165-105.000.

Rouse, Paul L.; and Francis, Robert L., to International Harvester Company. Grain pan bottom door. 3,913,589, Cl. 130-24.000.

Roussel Uclaf: *See—*
Gasc, Jean-Claude; and Torelli, Vesperto, 3,914,420.

Routien, John B.: *See—*
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 3,914,218.

Rovac Corporation, The: *See—*
Edwards, Thomas C., 3,913,351.

Rowader, Richard B.: *See—*
Hall, Lee Z.; and Rowader, Richard B., 3,913,498.

Rowland, Michael L.; and Stephens, George C. Sanitary ice storage and dispensing apparatus and method. 3,913,343, Cl. 62-137.000.

Rowland Products, Inc.: *See—*
Randall, Robert E., 3,914,362.

Rowley, William N.; and Ehret, Gordon F., to Weil-McLain Company, Inc. Fluid pumping assembly. 3,914,072, Cl. 417-423.00R.

Roy, Paul A., to Avco Corporation. Reinforcing ultra-centrifuge rotors. 3,913,828, Cl. 233-27.000.

Rozand, Jacques: *See—*
Lazarre, Flavien; Blu, Gilbert; and Rozand, Jacques, 3,913,560.

Rubey, Ulyss Ray, to United Wiring & Manufacturing Co., Inc. Manual stringer. 3,913,630, Cl. 140-123.000.

Rudner, Bernard; and Pauly, Peter Daniel, to Tenneco Chemicals, Inc. Method for production of polyurethane foam using oxazolines as catalysts. 3,914,189, Cl. 260-2.5AC.

Rudolph, Hans; Heine, Hans-Georg; Fuhr, Karl; and Schnell, Hermann, to Bayer Aktiengesellschaft. Butyric acid derivatives as novel photosensitizers. 3,914,166, Cl. 204-159.150.

Ruhl, Walter Franklin, to Lambert Corporation. Auger and blade therefor useable to move materials such as snow and the like. 3,913,247, Cl. 37-43.00E.

Ruhrmann, Ing. Josef, Dr.: *See—*
Thaler, Kurt; and Neugebauer, Alfred, 3,913,432.

Russell, David B.: *See—*
Ribich, William A.; and Russell, David B., 3,914,144.

Rusz, Tibor; and Jacobson, Elliott. Dynamic gas analyzer. 3,913,379, Cl. 73-27.00R.

Ruter, Edla, heiress: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Ruter, Elisabeth, heiress: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Ruter, Hermann, deceased: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.

Rutten, Donald E.; and Davis, Richard A., to P & D Manufacturing Co., Inc. Self-propelled feeder. 3,913,528, Cl. 119-52.00B.

Rutten, Hendrikus S.: *See—*
Versluis, Jan; Rutten, Hendrikus S.; and Kruisman, Gerard, 3,913,157.

S&S Corrugated Paper Machinery Co., Inc.: *See—*
Flaum, Stephen S., 3,913,464.

Saad, Oscar C.: *See—*
Nehra, Samuel A.; Saad, Oscar C.; and LaBrecque, Raymond E., 3,913,577.

Saco-Lowell Corporation: *See—*
Savageau, Richard J.; Clevenger, Earl C.; and Anderson, Gordon C., 3,913,190.

Saglio, Robert, to Commissariat a l'Energie Atomique. Method of compensation for the angle of refraction of an ultrasonic beam and a device for the application of said method. 3,913,386, Cl. 73-67.50R.

Sahl, Gary L. Multiple loop configuration puzzle. 3,913,910, Cl. 273-157.00R.

Saiia, Anthony J.: *See—*
Kaercher, William C., Jr.; Haffner, Donald G.; and Saiia, Anthony J., 3,913,682.

St. John, John G., to Baldwin-Gegenheimer Corporation. Liquid dispensing apparatus. 3,913,611, Cl. 137-453.000.

Saito, Seiichi: *See—*
Katahira, Yukio; and Saito, Seiichi, 3,913,868.

Saito, Yuzi: *See—*
Hirose, Kiyoshi; Shiozawa, Kaoru; and Saito, Yuzi, 3,913,819.

Sakai, Naomi: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 3,914,160.

Sakai, Toshimitsu: *See—*
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,325.
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,418.

Sakamoto, Sukehiko: *See—*
Shima, Takesaburo; Sakamoto, Sukehiko; and Fujii, yoshikazu, 3,914,339.

Sakita, Takashi; and Taguchi, Gyota, to Nisshin Oil Mills, Ltd., The. Process for preparing meat-like foodstuffs. 3,914,443, Cl. 426-274.000.

Salakari, Usko Martti Johannes. Antiskidding device for motor vehicle tire. 3,913,650, Cl. 152-210.000.

Sale, Dwight B.; and Koelzer, Terry R., to Guy F. Atkinson Company. Torque limiting system and method. 3,913,419, Cl. 74-857.000.

Sanders Associates, Inc.: *See—*
Young, Donald S., 3,914,710.

Sandoz Ltd.: *See—*
Ebner, Cuno; and Schuler, Max, 3,914,226.

Sang-Yol, An, to Hyundai Motor Company. Carburetor throttle valve with fuel re-sprayer. 3,914,350, Cl. 261-65.000.

Sangamo Electric Company: *See—*
Finlay, Alexander, Jr.; Dyer, Robert E.; and Kessler, William D., 3,914,757.

Sankyo Company Limited: *See—*
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.

Sansui Electric Co., Ltd.: *See—*
Kurata, Hirotaka, 3,914,716.
Takahashi, Susumu, 3,914,705.

Sanwa Seiki Mfg. Co. Ltd.: *See—*
Sekiguchi, Yukichi, 3,913,983.

Sarges, Reinhard: *See—*
Evanega, George R.; Kuhla, Donald E.; and Sarges, Reinhard, 3,914,426.

Sarring, Ernest J., to Rockwell International Corporation. Feed, transport and delivery mechanism. 3,913,750, Cl. 214-1.0BB.

Sasaki, Soji; Tadauchi, Masaharu; and Ito, Takashi, to Hitachi, Ltd. Ultrasonic flaw detector. 3,913,387, Cl. 73-67.80S.

Sasaki, Tatsuo: *See—*
Kano, Saburo; Sasaki, Tatsuo; and Kobayashi, Toshihiro, 3,914,098.

Sasse, Klaus: *See—*
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Sato, Eiichi, to Ogawa Hoso System Kabushiki Kaisha. Method of and apparatus for fusion-bonding thermoplastic tape in strapping machine. 3,914,153, Cl. 156-499.000.

Sato, Hitoshi, to Niles Parts Company Limited. Direction turn signal system. 3,914,737, Cl. 340-55.000.

Sato, Katsunobu: *See—*
Ikeda, Tsuneo; Sato, Katsunobu; and Sugiyama, Hiroshi, 3,914,273.

Sato, Masamichi: *See—*
Fukushima, Osamu; Sato, Masamichi; and Matsumoto, Seiji, 3,913,524.

Sato, Nakaya, to Arimino Chemical Co. Ltd. Rod for use in cold permanent waving. 3,913,593, Cl. 132-40.000.

Sato, Nobuyuki: *See—*
Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, 3,913,384.

Satterfield, Paul M. Film transport and registration system for motion picture camera. 3,914,035, Cl. 352-191.000.

Savageau, Richard J.; Clevenger, Earl C.; and Anderson, Gordon C., to Saco-Lowell Corporation. Spindle whirl cleaner. 3,913,190, Cl. 28-19.000.

Saverin, Eckehard; and Zimmermann, Jorg, to Schoeller, Felix, Jr. Polyolefin-coated photographic carrier material. 3,914,522, Cl. 428-513.000.

Sawa, Hiroshi; Aratani, Isamu; and Narita, Koji, to Inoue Rubber Company, Ltd. Decorative synthetic resin braiding. 3,914,482, Cl. 428-31.000.

Sawabe, Eiichi: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Sawai, Joe Y.: *See—*
Johnson, Roger E.; and Sawai, Joe Y., 3,913,272.

Sawyer, Arthur W.; and Csejka, David A., to Olin Corporation. Borate esters prepared by successive reactions of boric acid with glycol. 3,914,275, Cl. 260-462.00R.

Sayles, David C., to United States of America, Army. Propellant with acrylate copolymer binder and butanetriol trinitrate plasticizer. 3,914,141, Cl. 149-19.300.

Sayles, David C., to United States of America, Army. Solid propellants with biradical burning rate catalysts. 3,914,142, Cl. 149-19.800.

Scales, Stanley R.; and Prince, Richard B., to Hughes Tool Company. Journal bearing and method utilizing high carbon surface. 3,913,988, Cl. 308-8.200.

Schaar, Charles H., to Colgate-Palmolive Company. Disposable diaper. 3,913,578, Cl. 128-287.000.

Schacht, Daniel Jay: *See—*
Schacht, Ezra L.; and Schacht, Daniel Jay, 3,914,598.

Schacht, Ezra L.; and Schacht, Daniel Jay. Photocell controlled circuit. 3,914,598, Cl. 250-206.000.

Schacht, Lewis C. Apparatus for sexual restraint of a bull. 3,913,574, Cl. 128-138.00R.

Schaefer, Walter Rudolph: *See—*
Fitch, Scott McDowell; Kolensky, Leo Michael; Panek, Joseph Conrad; Rife, David Charles; and Schaefer, Walter Rudolph, 3,914,743.

Schaffner, Donald L., to Fiat-Allis Construction Machinery, Inc. Endless track for vehicle. 3,913,986, Cl. 305-57.000.

Schaffner, Karl; Meisels, Alex; Roger, Jean Claude; and Weis, Claus D., to CIBA-GEIGY Corporation. Heterocyclic spiro compounds. 3,914,222, Cl. 260-247.20A.

Schanzer, Hans-Peter: *See—*
Kramer, Willi; and Schanzer, Hans-Peter, 3,913,468.

Schardt, Courtney Harold; and Schepis, Albert James, to American Telephone and Telegraph; and Bell Telephone Laboratories, Incorporated. Apparatus and method for tracing jumpers in a main distributing frame. 3,914,561, Cl. 179-175.30A.

Scharer, Willy: *See—*
Heimlicher, Paul; Rohrer, Jean; and Scharér, Willy, 3,913,855.

Scheffer, Maarten: *See—*
van der Sluys, Willem Ludovicus Nicolaas; and Scheffer, Maarten, 3,913,899.

Scheiber, David Hitz; and Weaver, Richard Vroman, to Du Pont de Nemours, E. I., and Company. Photohardenable paste compositions having high resolution. 3,914,128, Cl. 96-115.00P.

Scheinpflug, Hans: *See—*
Kramer, Wolfgang; Buchel, Karl Heinz; Meiser, Werner; Frohberger, Paul-Ernst; and Scheinpflug, Hans, 3,914,427.
Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, 3,914,284.

Schepis, Albert James: *See—*
Schardt, Courtney Harold; and Schepis, Albert James, 3,914,561.

Schepp, Horst: *See—*
Helm, Dietrich; and Schepp, Horst, 3,914,204.

Scherbaum, Rudolf: *See—*
Schreiner, Horst; and Scherbaum, Rudolf, 3,913,201.

Schering AG.: *See*—
Helm, Dietrich; and Schepp, Horst, 3,914,204.

Schering Corporation: *See*—
Knapp, Julius Z.; and Hershberg, Emanuel B., 3,914,058.

Scherping, Clarence K., to Baker Perkins Inc. Continuous mixer. 3,913,893, Cl. 259-5.000.

Scherr, George H., to Scherr, George H. Projectile. 3,913,487, Cl. 102-92.100.

Schiessl, Alois; and Huber, Paul, to Buck K.G., Firma. Manually-operated projectile-launching devices. 3,913,482, Cl. 102-32.000.

Schiminski, Herbert: *See*—
Lenk, Erich; Turk, Herbert; and Schiminski, Herbert, 3,913,852.

Schladitz, Hermann J. Device for vaporizing fuel oil. 3,914,096, Cl. 431-208.000.

Schlumberger Technology Corporation: *See*—
Curtis, M. Rex, deceased, 3,913,398.

Schmickl, Helfried; and Kohlhammer, Walter, to Siemens Aktiengesellschaft. Ceramic capacitor for use with thin layer circuits. 3,914,666, Cl. 317-261.000.

Schmid, J. Leonhard. Portable display case. 3,913,711, Cl. 190-16.000.

Schmid, Markus, to Concast AG. Adjustable plate mold for continuous casting. 3,913,658, Cl. 164-280.000.

Schmidt, Peter: *See*—
Lapple, Egon; and Schmidt, Peter, 3,913,536.

Schmidt, Ronald Vernon: *See*—
Rosenberg, Robert L.; and Schmidt, Ronald Vernon, 3,914,717.

Schnabel, Horst; and Mitzlaff, Michael, to Hoechst Aktiengesellschaft. Process for preparing secondary N-vinyl carboxylic acid amides. 3,914,304, Cl. 260-561.00R.

Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, to Cassella Farbwerke Mainkur Aktiengesellschaft. Aminoplast resin modified with methylene bisformamide and laminated thermosetting decorative sheets. 3,914,523, Cl. 428-528.000.

Schnell, Hermann: *See*—
Rudolph, Hans; Heine, Hans-Georg; Fuhr, Karl; and Schnell, Hermann, 3,914,166.

Schoeller, Felix, Jr.: *See*—
Saverin, Eckehard; and Zimmermann, Jorg, 3,914,522.

Schoenholz, Daniel; Petersen, Arthur W.; and Hirschberger, Leonard, to American Cyanamid Company. Protective coating composition. 3,914,197, Cl. 260-28.50A.

Schoenly, Alfred R., to Scriptomatic, Inc. Card tray. 3,913,777, Cl. 220-22.300.

Schoennagel, Hans-Juergen, to Mobil Oil Corporation. Hydrocarbon reforming process with heated aromatic recycle. 3,914,171, Cl. 208-135.000.

Scholten, Stephen Clair: *See*—
Lohr, Thomas Herbert; and Scholten, Stephen Clair, 3,913,692.

Schoolcraft, Robert B.: *See*—
Luppens, Patrick M., 3,913,968.

Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, to International Flavors & Fragrances Inc. Imparting a nutty flavor with 2-butyl-2-butenal. 3,914,451, Cl. 426-534.000.

Schreiner, Horst; and Scherbaum, Rudolf, to Siemens Aktiengesellschaft. Bonded material for electrical contact pieces. 3,913,201, Cl. 29-182.500.

Schubert & Salzer Maschinenfabrik Aktiengesellschaft: *See*—
Suppe, Hansjoachim, 3,913,356.

Schuhmann, Siegfried: *See*—
Cappel, Bert; Schuhmann, Siegfried; and Wolf, Klaus, 3,913,479.

Schuldt, Erich Henry, Jr.: *See*—
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.

Schuler, Max: *See*—
Ebner, Cuno; and Schuler, Max, 3,914,226.

Schulman, Martin: *See*—
Ballin, Gene, 3,913,178.

Schulte, Klaus: *See*—
Ersfeld, Heinrich; Schulte, Klaus; and Boden, Heinrich, 3,913,892.

Schultz, James R.: *See*—
Norsby, Norrain E.; and Schultz, James R., 3,914,456.

Schulz, Jay R.: *See*—
Lee, Chi-Long; and Schulz, Jay R., 3,914,199.

Schulze, Erwin F. C., to Addressograph-Multigraph Corporation. Sheet distributing mechanism. 3,913,905, Cl. 271-64.000.

Schumacher, Gunter: *See*—
Schumacher, Gustav, II; and Schumacher, Gunter, 3,913,306.

Schumacher, Gustav, II; and Schumacher, Gunter. Harvester attachment having a resiliently supported tiltable slide rail. 3,913,306, Cl. 56-313.000.

Schwarte, Jurgen: *See*—
Juntgen, Harald; Knoblauch, Karl; Gappa, Gunther; and Schwarte, Jurgen, 3,913,253.

Schwartz, Bertram: *See*—
Dyment, John Cameron; and Schwartz, Bertram, 3,914,465.

Schwartz, Nelson N.: *See*—
Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,188.
Carroll, Felix P.; Panchak, John R.; and Schwartz, Nelson N., 3,914,190.

Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, to United States of America, Agriculture. Arthropod maturation inhibitors. 3,914,260, Cl. 260-348.00A.

Schwarzenbach, Kurt; and Rosenberger, Siegfried, to Ciba-Geigy Corporation. Phosphoric acid anilides. 3,914,344, Cl. 260-953.000.

Schweizer, Hanspeter: *See*—
Kane, James; and Schweizer, Hanspeter, 3,914,515.

Sciavolino, Frank C.: *See*—
Celmer, Walter D.; Sciavolino, Frank C.; Cullen, Walter P.; and Routien, John B., 3,914,218.

SCM Corporation: *See*—
Gawrilow, Ilija, 3,914,453.
Norris, Max E., 3,914,452.

Scott, Gordon C.: *See*—
Madden, James F.; and Scott, Gordon C., 3,913,570.

Scott, Harry B.: *See*—
Lankenau, Arthur W.; and Scott, Harry B., 3,913,890.

Scott, Milford M., Jr., to STP Corporation. Self-modulating air bleed apparatus and method for internal combustion engine. 3,913,541, Cl. 123-119.00D.

Scott, Milford Melvin: *See*—
Over, Charles Edward; and Scott, Milford Melvin, 3,913,322.

Scott, Robert J., to Union Carbide Corporation. Methyl format E-trichloromonofluoromethane blowing agent for polystyrene. 3,914,191, Cl. 260-2.50E.

Scott, Thaddeus LeRoy. Exposure time testing apparatus for focal-plane cameras. 3,913,376, Cl. 73-5.000.

Scott, William P.; and Swartz, Charles J., to Continental Oil Company. Extended bearing lubrication method and apparatus. 3,913,992, Cl. 308-187.000.

Scovill Manufacturing Company: *See*—
Wallin, Gus Waldemar, 3,914,673.

Scriptomatic, Inc.: *See*—
Schoenly, Alfred R., 3,913,777.

Scriven, George A. Holder for fishing leaders and the like. 3,913,864, Cl. 242-125.200.

Scrocco, Joseph; and Cottingham, Hugh, to Kabushiki Kaisha Suwa Seikosha. Safety locking cap. 3,913,769, Cl. 215-206.000.

Seaborn, George C., Jr. Emergency communication system. 3,914,692, Cl. 325-53.000.

Seals, Harold, to Kline, Larry Harold. Bag holding and filling device. 3,913,635, Cl. 141-83.000.

Seals, Harold, to Kline, Larry Harold. Revolving bagging machine. 3,913,637, Cl. 141-151.000.

Seals, Harold, to Kline, Larry Harold. Take-off device. 3,913,638, Cl. 141-151.000.

Searle, Robert J. G.; Woodall, Roger E.; and Bull, Michael J., to Shell Oil Company. Cyanobenzyl cyclopropane carboxylates. 3,914,274, Cl. 260-465.00D.

Sears, Roebuck and Co.: *See*—
Speyer, Henning J., 3,913,908.

Seats, Incorporated: *See*—
Carter, John W., 3,913,975.

Seddon, Richard Ian: *See*—
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, 3,914,464.

Sedlock, Daniel T., to Abex Corporation. Welded friction article and method of assembly. 3,913,716, Cl. 192-107.00R.

Seeds, Robert B.; and Luce, Robert L., to Fairchild Camera and Instrument Corporation. Method of MOS transistor manufacture. 3,913,211, Cl. 29-571.000.

Seeley, Robert Dudley: *See*—
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.

Seely, John Hunter: *See*—
Gendrich, Ronald Lee; Rippel, Riemond Henry; and Seely, John Hunter, 3,914,412.

Seguin, Michel: *See*—
Puyhaubert, Jean; and Seguin, Michel, 3,914,718.

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Communication system employing spectrum folding. 3,914,554, Cl. 179-15.55R.

Seidel, Michael C.; Von Meyer, William C.; and Greenfield, Stanley E., to Rohm and Haas Company. 1,2,4,-4H-Triazole derivatives. 3,914,223, Cl. 260-247.50E.

Seidel, Nancy Anne. Medical testing device. 3,913,790, Cl. 222-132.000.

Seidler, Jack, to Continental Specialties Corporation. Test clip. 3,914,007, Cl. 339-255.00P.

Seitas, Donald Lawrence: *See*—
Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, 3,914,302.

Seki, Michiharu: *See*—
Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, 3,914,390.

Seki, Yoshivuki: *See*—
Watanabe, Hideo; Seki, Yoshivuki; and Takeuchi, Jikko, 3,914,544.

Sekiguchi, Takeshi, to Canon Kabushiki Kaisha. Color television camera with a color-resolving optical system. 3,914,787, Cl. 358-50.000.

Sekiguchi, Yukichi, to Sanwa Seiki Mfg. Co. Ltd. Modulator for use in air brake system with anti-skid device. 3,913,983, Cl. 303-21.00F.

Sele, Alex: *See*—
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 3,914,212.

Selmeczi, Joseph G., to Dravo Corporation. Process for wet scrubbing of sulfur dioxide from flue gas. 3,914,378, Cl. 423-242.000.

Semenchuk, Joe. Curling broom. 3,913,164, Cl. 15-210.00R.

Senatro, Clement A., to United Technologies Corporation. Shrouded flammable fluid carrying tube. 3,913,949, Cl. 285-14.000.

Servadio, Gildo J.; Perreault, Arthur W.; and Jones, John C., to Heublein, Inc. Stabilization of vodka. 3,914,442, Cl. 426-271.000.

Service Dynamics, Inc.: *See—*
Strauss, Robert F.; and Lawrenz, Carl F., 3,913,979.

Servotronics, Inc.: *See—*
Trbovich, Nicholas D.; Robinson, William P.; and Trunzo, Eugene R., 3,913,913.

Sessler, Geraldine W.: *See—*
Sessler, Stanley S., 3,913,648.

Sessler, Stanley S., to Sessler, Geraldine W., a part interest. Golf club bag cover. 3,913,648, Cl. 150-1.50R.

Sette, James J. One-piece dispenser cap and childproof actuator. 3,913,805, Cl. 222-402.110.

Sevillia, Daniel E.: *See—*
Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., 3,913,827.

Seward, Gerald Hugh; and Wilson, Donald, to Shandon Southern Instruments Limited. Microtome knife-holder. 3,913,903, Cl. 269-100.000.

Seyk, Ronald F., to Raymond Lee Organization Inc, a part interest. Portable alarm actuated by attempted theft. 3,914,756, Cl. 340-280.000.

Seymour, Claude W. Rake device. 3,913,169, Cl. 15-369.000.

Seymour, David Jackson: *See—*
Kirby, William Everett; and Seymour, David Jackson, 3,913,512.

Shackelford, Harold D.: *See—*
Purdom, Clyde H.; Allum, Kenneth W.; and Shackelford, Harold D., 3,913,731.

Shaffer, Gary W.; Kitchens, Garry C.; and Kaiser, Kent, to Givaudan Corporation. Oxygenated derivatives of thujopsene. 3,914,314, Cl. 260-586.00P.

Shaffer, Ronald J., to Westinghouse Air Brake Company. Oil leakage recycler. 3,913,328, Cl. 60-592.000.

Shallenberger, John M.; Hornak, Leonard P.; and Desmarchais, Walter E., to Westinghouse Electric Corporation. Inspection and repair apparatus for a nuclear reactor fuel assembly. 3,914,613, Cl. 250-515.000.

Shandon Southern Instruments Limited: *See—*
Seward, Gerald Hugh; and Wilson, Donald, 3,913,903.

Sharabash, Moustafa M., to Eli Lilly and Company. Enteric compositions. 3,914,401, Cl. 424-19.000.

Sharon, Uzi, to Laser Industries Ltd. Laser device with articulated arm. 3,913,582, Cl. 128-303.100.

Shasha, Baruch S.: *See—*
Trimnell, Donald; Shasha, Baruch S.; and Doane, William M., 3,914,214.

Shaver, Douglas W., to Raymond Lee Organization, Inc., a part interest. Protection device for engine operating on gas-oil mixture. 3,913,551, Cl. 123-198.0DB.

Shaw, Carl B.: *See—*
Cason, John L., Jr.; and Shaw, Carl B., 3,914,612.

Shaw, James L.: *See—*
Manecke, Siegfried E.; and Shaw, James L., 3,914,661.

Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., to Sterling Drug Inc. Basic esters of polyhydro-2-phenanthrylidene-acetic acids. 3,914,254, Cl. 260-327.00M.

Shaw, William H., to Woomer, Joyce M.; Mattas, Oliver E., Jr.; and Woomer, Robert E., part interest to each. Tissue dispenser with clips for disposal bag. 3,913,810, Cl. 224-42.45B.

Shawhan, Elbert N., to Sun Oil Company of Pennsylvania. Frequency modulation circuit. 3,914,694, Cl. 325-145.000.

Shay, Joseph Leo: *See—*
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, 3,913,212.

Sheehan, Desmond, to American Cyanamid Company. Anhydride of anthracene derivative. 3,914,255, Cl. 260-333.000.

Sheeks, Oliver P. Rate-of-flow meter with attached generator. 3,913,399, Cl. 73-229.000.

Shell, John W., to ALZA Corporation. Ophthalmic dosage form, for releasing medication over time. 3,914,402, Cl. 424-32.000.

Shell Oil Company: *See—*
Entwistle, Ian D.; Williams, Peter J.; and Devlin, Barry R. J., 3,914,244.
Haddock, Ernest; and Hopwood, William J., 3,914,300.
Jobe, John D., 3,913,385.
Lev, Yaacov, 3,914,688.
Nozaki, Kenzie, 3,914,391.
Petty, Walter L., 3,914,209.
Searle, Robert J. G.; Woodall, Roger E.; and Bull, Michael J., 3,914,274.
Udding, Anne C., 3,914,211.
Versluis, Jan; Rutten, Hendrikus S.; and Kruisman, Gerard, 3,913,157.

Shelley, Ralph Ray, Jr., to Dow Chemical Company, The. Epoxy resin compositions containing 2-chloro-1-chloromethylethyl-2,3-epoxy propyl ether. 3,914,202, Cl. 260-47.0EP.

Shellhause, Ronald L., to General Motors Corporation. Flow sensitive valve mechanism. 3,913,327, Cl. 60-585.000.

Shelnutt, Robbie E., to Southwire Company. Scr and diode tester. 3,914,690, Cl. 324-158.00D.

Shepard Chemical Industries, Inc.: *See—*
Graves, Robert E., 3,914,439.

Shepherd, Thomas H.; and Gould, Francis E., to National Patent Development Corporation. Cosmetic and toothpaste preparations. 3,914,405, Cl. 424-49.000.

Sheppard, William Arthur, to Du Pont de Nemours, E. I., and Company. 2-(Phenylhalonium)-4,5-dicyano-2H-imidazole ylids. 3,914,247, Cl. 260-309.000.

Sherritt Gordon Mines Limited: *See—*
Fustukian, David A. W., 3,914,507.

Sherwood Medical Industries Inc.: *See—*
Berliner, Mayer; and Stewart, James G., 3,914,002.

Shibata, Yoshiyuki: *See—*
Yamakami, Kiyoshi; Akazawa, Osamu; Shibata, Yoshiyuki; and Fujimoto, Nichio, 3,914,280.

Shields, James J.: *See—*
Yannone, Robert A.; and Shields, James J., 3,913,314.

Shigehara, Itaru: *See—*
Takahashi, Ryohei; Yokomichi, Isao; Shigehara, Itaru; and Komyoji, Terumasa, 3,914,240.

Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, to Glory Kogyo Kabushiki Kaisha. Automatic money dispenser. 3,914,579, Cl. 235-61.70B.

Shiina, Naonori; and Hosoda, Kirokuro, to Furukawa Electric Co., Ltd., The. Method for rotational molding of composite foamed plastic articles. 3,914,361, Cl. 264-45.400.

Shima, Takesaburo; Sakamoto, Sukehiko; and Fujii, yoshikazu, to Sumitomo Chemical Company, Limited. Process for producing rubber-modified plastics. 3,914,339, Cl. 260-880.00R.

Shimada, Shojiro, to Sony Corporation. Four-channel stereo apparatus for switching between two channel and four channel inputs. 3,914,790, Cl. 360-63.000.

Shimazaki, Nobuyoshi: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.

Shimizu, Teruhiko: *See—*
Kozasu, Isao; and Shimizu, Teruhiko, 3,914,135.

Shimizudani, Noriroo: *See—*
Kurose, Yukiteru; and Shimizudani, Noriroo, 3,913,382.

Shiozawa, Kaoru: *See—*
Hirose, Kiyoshi; Shiozawa, Kaoru; and Saito, Yuzi, 3,913,819.

Shipman, Calvin J.: *See—*
Cathers, George I.; and Shipman, Calvin J., 3,914,388.

Shods Incorporated: *See—*
Bucalo, Louis, 3,913,679.

Shokler, Morris: *See—*
Holden, Homer N.; Shokler, Morris; and Lamden, Sidney K., 3,913,622.

Showa Seisakusho Co.: *See—*
Nakane, Sunao; and Wake, Kiyoyasu, 3,913,170.

Shuey, David Rollin: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.

Shuh, Lewis M.: *See—*
Keating, Raymond J.; Shuh, Lewis M.; and Wells, Roy E., 3,913,628.

Shulman, N. Raphael; and Coleman, Cecil R., to United States of America, United States. Stable antigen-erythrocytes for measuring antibodies against toxoplasma organism. 3,914,400, Cl. 424-12.000.

Shurtleff, William Francis. Mild-steel cutter. 3,913,227, Cl. 30-181.000.

Shuster, Edward J.: *See—*
Chappell, Robert L.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred H., 3,914,322.
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.
Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, 3,914,451.

Sidoti, Daniel Robert: *See—*
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.

Siefert, August C., to Owens-Corning Fiberglas Corporation. Fiber reinforced elastomers. 3,914,499, Cl. 428-292.000.

Siegel, Harold B., to Pharmacare, Inc. Package assembly. 3,913,734, Cl. 206-498.000.

Siegwart, Emil. Flexible corrugated tube. 3,913,623, Cl. 138-122.000.

Siemens Aktiengesellschaft: *See—*
Amend, Wilhelm; and Sotirovic, Toma, 3,914,707.
Drubig, Horst, 3,914,720.
Dull, Hans-Jurgen, 3,913,492.
Durschner, Rolf, 3,914,530.
Heckl, Herwig, 3,913,215.
Holtz, Joachim, 3,914,669.
Holtz, Joachim, 3,914,670.
Meier, Werner, 3,914,627.
Neufang, Karlheinz, 3,914,552.
Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, 3,913,224.
Rother, Klaus Dieter, 3,914,558.
Schmickl, Helfried; and Kohlhammer, Walter, 3,914,666.
Schreiner, Horst; and Scherbaum, Rudolf, 3,913,201.

Siemer, Harm: *See—*
Glatt, Werner; and Siemer, Harm, 3,913,847.

Siepmann, Walter, to Eugen Vogt. Valve housing and method of making the same. 3,913,887, Cl. 251-367.000.

Siergiej, John M.: *See—*
Colombi, Gianfranco; Gabaglio, Mario; Liscia, Aldo; Boccalari, Mario; and Siergiej, John M., 3,913,208.

Sieving, Alfred W.: *See—*
Gee, James E.; Sieving, Alfred W.; and Ping, David T., 3,913,948.

Sieving, Alfred William, to Caterpillar Tractor Co. Engine exhaust system. 3,913,705, Cl. 181-36.00D.

Signetics Corporation: *See—*
Ballonoff, Aaron, 3,913,216.

Silwones, Steven S.: *See—*
Fineran, Charles A.; and Silwones, Steven S., 3,914,178.

Simmons, Samuel P.: *See—*
Markovitch, Branko, 3,913,961.

Simpson, Melvin L.: *See—*
Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., 3,913,553.

Simpson, Wilburn Dwain: *See—*
Barnes, Elwood Eugene; Emerson, Sidney Thomas; Rogers, Paul Clifton; and Simpson, Wilburn Dwain, 3,914,747.

Sims, David S.; and Thompson, John H., to United States of America, Navy. Underwater acoustic surveillance of harbor and channel areas. 3,914,729, Cl. 340-3.00R.

Sinclair, Alex H.; and Otto, Robert J., to United States of America, Army. Variable height and variable spring rate suspension system. 3,913,939, Cl. 280-124.00F.

Singer, Arnold J., to Block Drug Company, Inc. Spray head for aerosol can. 3,913,842, Cl. 239-337.000.

Singer Company, The: *See—*
Adams, Kenneth D.; Hauf, Robert C.; and Ostapczuk, Edward W., 3,913,506.
Cooksey, John Andrew, 3,914,654.
Crumbliss, Robert T.; and Hendricks, Jerry V., 3,913,505.
Ljung, Bo H. G.; and Stiles, John C., 3,913,405.
Mallinson, Richard B.; and Mecklenborg, Richard A., 3,914,011.
McCanney, Neil R., 3,913,245.

Sinloihi Company Limited: *See—*
Takagi, Masaru, 3,914,372.

Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, to Snia Viscosa Societa' Nazionale Industria Applicazioni Viscosa S. p. A. Method for the production of cyclopentamethylene ketene. 3,914,313, Cl. 260-585.500.

Sisler, Hampson A. Imaging device for creating the appearance of a missing anatomical member. 3,914,031, Cl. 350-298.000.

Sivilich, Daniel M.: *See—*
Srinivasan, Subramani; and Sivilich, Daniel M., 3,913,579.

SKF Industrial Trading and Development Company B.V.: *See—*
Ernst, Horst M., 3,913,993.

Skinner, Geoffrey Frederick, to Foster Wheeler Energy Corporation. Sulfur recovery from fluidized bed which heats gas in a closed circuit gas turbine. 3,913,315, Cl. 60-39.18R.

Skreiner, Klaus M., to General Electric Company. Ring latch for releasably restraining a piston within a cylinder. 3,913,459, Cl. 92-23.000.

Slade, Woodrow W., to Owens-Illinois, Inc. Benefication of siderite contaminated sand. 3,914,385, Cl. 423-340.000.

Slater, Dan, to Magicam Inc. Optical node correcting circuit. 3,914,540, Cl. 178-6.800.

Slavitter, Frederick, to Polaroid Corporation. Depressible coupling apparatus. 3,914,777, Cl. 354-196.000.

Smedberg, George Elmer, to Du Pont de Nemours, E. I., and Company. High performance hot melt adhesive backsizing compositions and carpet made therewith. 3,914,489, Cl. 428-97.000.

Smith, A. E. Insecticide applicator for animals. 3,913,530, Cl. 119-159.000.

Smith, Alexander M., II, to Fiberwoven Corporation, The. Fluid aid for needling. 3,913,191, Cl. 28-72.20R.

Smith, Colin: *See—*
Brooke, Peter Howard; Dickinson, Ian James; Kavanagh, David Cecil; and Smith, Colin, 3,914,118.

Smith, Dwain: *See—*
Parker, George, Sr., 3,914,115.

Smith, Francis Hughes; and Moore, Derek Stanley, to Vickers Limited. Apparatus for measuring reflectivity. 3,914,057, Cl. 356-118.000.

Smith, George W.: *See—*
Beckerman, Martin; Murphy, John A.; Orlandi, John V.; and Smith, George W., 3,914,000.

Smith, Harry A., to Dow Chemical Company, The. Unsaturated formaldehyde copolymer resins derived from diaryl oxides, sulfides, dibenzofuran or dibenzothiophene. 3,914,194, Cl. 260-18.00R.

Smith, Jimmie L.: *See—*
Atanasoff, Irving M.; Gosnell, Russell J.; and Smith, Jimmie L., 3,913,849.

Smith-Johannsen, Robert: *See—*
Bedard, Ronald L.; Smith-Johannsen, Robert; and Moyer, Wendell W., Jr., 3,914,363.

Smith, Joseph A., to Allied Chemical Corporation. Process for the preparation of lactams. 3,914,217, Cl. 260-239.30A.

Smith, Melvin William, to Garcia Corporation, The. Racket stringing apparatus. 3,913,912, Cl. 273-73.00A.

Smith, Merton L.: *See—*
Strack, Richard R.; and Smith, Merton L., 3,914,117.

Smith, Norman E.: *See—*
Martin, Frank E.; Colston, John R.; and Smith, Norman E., 3,913,576.

Smith, Raymond P. Garage door extension structure. 3,913,266, Cl. 49-200.000.

Smithers, James P., to Armour and Company. Machine for trimming and slicing bacon slabs. 3,913,434, Cl. 83-163.000.

Smyrl, Kenneth E., to Dresser Industries, Inc. Methods and apparatus for sand control in underground boreholes. 3,913,675, Cl. 166-278.000.

Snasel, Josef: *See—*
Bayer, Oldrich; Snasel, Josef; and Premyslovsky, Jiri, 3,913,466.

Snell, Leonard Stanley, to Rolls-Royce (1971) Limited. Gas turbine engine power plant. 3,913,321, Cl. 60-226.00R.

Snia Viscosa Societa' Nazionale Industria Applicazioni Viscosa S. p. A.: *See—*
Sioli, Giancarlo; Giuffre, Luigi; Righi, Franco; and Matera, Giancarlo, 3,914,313.

Snyder, Harry R., Jr., to Morton-Norwich Products, Inc. 1-[5-Nitrofurfurylidene)amino]-4(and 5)-phenyl-2-imidazolidinone. 3,914,220, Cl. 260-240.00A.

Societa Italiana Elettronica S.p.A.: *See—*
Bianchini, Gianni, 3,914,662.

Societa Nebiolo S.p.A.: *See—*
Terzuolo, Giancarlo; and Capetti, Federico, 3,913,478.

Societe Anonyme: Ciments LaFarge: *See—*
Proner, Raymond Louis; and Bourgoin, Rene Leon Clement, 3,913,761.

Societe Anonyme Dite: L'Oreal: *See—*
Kalopissis, Gregoire; and Vanlerberghe, Guy, 3,914,407.

Societe Anonyme Exsymol: *See—*
Gueyne, Charles Henri Jean; and Duffaut nee Paumont, Marie Irene, 3,914,416.

Societe Lignes Telegraphiques et Telephoniques: *See—*
Puyhaubert, Jean; and Seguin, Michel, 3,914,718.

Societe Nationale Des Petroles D'Aquitaine: *See—*
Lazarre, Flavien; Blu, Gilbert; and Rozand, Jacques, 3,913,560.

Sofianek, Joseph C.: *See—*
Crouch, Donald W.; Kurtz, Donald R.; and Sofianek, Joseph C., 3,914,568.

Sola Basic Industries, Inc.: *See—*
Prior, James C., 3,914,563.

Solbern Corporation: *See—*
Eisenberg, Bernard C., 3,913,634.

Solco Basel AG: *See—*
Jaeger, Karl Heinrich, 3,914,425.

Solis, Dennis A.: *See—*
Hunden, Bob L., 3,913,981.

Sollerud, Soren Elof Mauritz, to Svenska Chokladfabriks Aktiebolaget. Conveying apparatus, especially for granular and lump form material. 3,913,791, Cl. 222-139.000.

Somlo, Tibor; and Murphy, James, to Ciba-Geigy AG. Tetrahydroanthraquinone oximes and process for their preparation. 3,914,263, Cl. 260-351.000.

Sommer, John G., Jr., to General Tire & Rubber Company, The. Method of improving fatigue life of molded sulfurcured rubber articles. 3,913,209, Cl. 29-451.000.

Sonnet, Philip E.: *See—*
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,914,260.

Sony Corporation: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 3,914,160.
Matsushita, Takeshi; Horinaga, Hiroshi; Ohtsu, Takaji; and Hayashi, Hisao, 3,914,781.
Shimada, Shojiro, 3,914,790.
Sugano, Saburo, 3,913,519.

Sotirovic, Toma: *See—*
Amend, Wilhelm; and Sotirovic, Toma, 3,914,707.

Soudijn, Willem; and van Wijngaarden, Ineke, to Janssen Pharmaceutica, N.V. 4-Aryl-α-(1,4-benzodioxan-2-yl)-4-hydroxy-1-piperidineethanols. 3,914,238, Cl. 260-293.580.

Southwire Company: *See—*
Chia, Enrique; Hanegan, Herbert M.; and Keith, Paul S., 3,914,009.
Shelnutt, Robbie E., 3,914,690.

Souza, Anthony J.; and Martin, Harlan W., to Woodstream Corporation. Collapsible live animal trap. 3,913,258, Cl. 43-60.000.

Sowinski, Francis Alexander: *See—*
Bernstein, Jack; and Sowinski, Francis Alexander, 3,914,294.

Sparks, Olin B. Method of constructing a box clip. 3,913,462, Cl. 93-1.00E.

Spartek Inc.: *See—*
Cable, Stephen J.; Fuller, Lee R.; and Hothem, John H., 3,914,099.

Special Sewing Systems, Inc.: *See—*
Boser, Ronald J., 3,913,508.

Speck, Frank T., to Fike Metal Products Corporation. Pressure relief structure for aerosol containers. 3,913,614, Cl. 137-543.190.

Spector, George: *See—*
Plancher, Luisa; and Spector, George, 3,913,976.

Spectrol Electronics Corporation: *See—*
Bernard, Russell J., 3,913,222.

Speedfam Corporation: *See—*
Boettcher, Stephen A., 3,913,271.

Speedie, Robert, to Illinois Tool Works Inc. Valve. 3,913,618, Cl. 137-610.000.

Speer, Howard David; and Gerke, Burton Elwood, Jr., to Black and Decker Manufacturing Company, The. Lower guard assembly for power saw. 3,913,437, Cl. 83-478.000.

Spees, Arthur T. Filing system and elements therefor. 3,913,250, Cl. 40-78.000.

Spembly Limited: *See—*
Ritson, Carl; and Thomas, Ernest Hilton, 3,913,581.

Spencer, Dennis Lincoln, to Knittax. Manual knitting machine with a needle selector mechanism. 3,913,353, Cl. 66-60.000.

Spencer, Jimmy J. Utility carrier. 3,913,811, Cl. 224-42.080.

Sperry, Peter R.: *See—*
Mercurio, Andrew; and Sperry, Peter R., 3,914,463.

Sperry Rand Corporation: *See—*
MacWade, Robert W.; and McDevitt, Bernard J., 3,914,677.

Speyer, Henning J., to Sears, Roebuck and Co. Barbell having a detachably mounted weight supporting bar. 3,913,908, Cl. 272-84.000.

Spra-Con Company, The: *See—*
Harrison, John, 3,913,725.

Sprague Devices, Inc.: *See—*
Frigon, Richard J., 3,913,167.

Sprague Electric Company: *See—*
Fabricius, John H., 3,914,727.

Sprung, Hartwig: *See—*
Becker, Klaus; and Sprung, Hartwig, 3,913,712.

Square D Company: *See—*
Reed, Ronald H.; and Diersing, Raymond A., 3,914,564.

Sridhar, Ramamritham: *See—*
O'Neill, Charles Edward; Sridhar, Ramamritham; and Bell, Malcolm Charles Evert, 3,914,124.

Srinivasan, Subramani; and Sivilich, Daniel M., to Personal Products Company. Flushable sanitary napkin. 3,913,579, Cl. 128-290.00W.

Sta-Tite Corporation: *See—*
Maranell, Melvin C., 3,913,888.

Stabilus GmbH: *See—*
Molders, Werner, 3,913,901.

Stach, Kurt: *See—*
Lerch, Ansgar; Popelak, Alfred; Stach, Kurt; Roesch, Egon; and Hardebeck, Klaus, 3,914,219.

Stache, Ulrich; Fritsch, Werner; Haede, Werner; and Lindner, Ernst, to Hoechst Aktiengesellschaft. Cardenolido-3-[4'-amino-2', 3', 4'-tridesoxy-glycosides] and process for their manufacture. 3,914,213, Cl. 260-210.500.

Stahl, William J., to National Manufacturing Company. Machine for trimming the edges of metal containers. 3,913,435, Cl. 83-193.000.

Stahle, Helmut: *See—*
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, 3,914,432.

Stahlgruber Otto Gruber & Co.: *See—*.
Pott, Richard, 3,913,728.

Stahlwerke Peine-Salzgitter Aktiengesellschaft: *See—*
Berner, Klaus; Kugler, Jorg; and Grote, Hans-Gunther, 3,913,388.

Stanaitis, Peter P., to Textron Inc. Fastener assembly. 3,913,649, Cl. 151-38.000.

Standaart, Adrian W. Electron gun construction for multi-beam color cathode ray tube. 3,914,641, Cl. 313-411.000.

Standard Oil Company, The: *See—*
Giddings, Brandford E.; and Rosen, Irving, 3,914,337.
Lee, Richard J., 3,914,203.

Stanek, Jaroslav: *See—*
Baschang, Gerhard; Stanek, Jaroslav; Rossi, Alberto; and Sele, Alex, 3,914,212.

Stapley, Edward O.; and Mata, Justo M., to Merck & Co., Inc. Preparation of antibiotics by fermentation. 3,914,157, Cl. 195-80.00R.

Stapley, Edward O.; and Mata, Justo M., to Merck & Co., Inc. Antibiotic production. 3,914,158, Cl. 195-80.00R.

Stapley, Edward O.: *See—*
Hendlin, David; Stapley, Edward O.; Del Val, Sagrario Mochales; and Mata, Justo Martinez, 3,914,231.

Starichnev, Vladimir Viktorovich: *See—*
Kostjunin, Boris Nikolaevich; Zadvorny, Alfred Fedorovich; Ragutsky, Arnold Mikhailovich; and Starichnev, Vladimir Viktorovich, 3,913,613.

Starks, Charles M.; and Portwood, Owen, Jr., to Continental Oil Company. Alkyl arylsulfonate exchange process. 3,914,272, Cl. 260-456.00P.

Stauffer Chemical Company: *See—*
Blake, Robert Joseph, 3,914,328.
Brokke, Mervin E., 3,914,251.
Chan, Jimmy Hua-Hin; Kalbfeld, Jules; Kostecki, John Albert; Pitt, Harold Mahonrai; and Seitas, Donald Lawrence, 3,914,302.
Pallos, Ferenc M.; and Tseng, Chien K., 3,914,321.
Pitt, Harold M.; Zeleny, Richard A.; and Knoshaug, Wendell E., 3,914,346.

Stauffer, Reuben Laverne, to Bendix Corporation, The. Half-bridge audio amplifier. 3,914,703, Cl. 330-17.000.

Stearley, John W., to Robertshaw Controls Company. Control device with control knob securing the shield cover. 3,914,660, Cl. 317-118.000.

Stebe, Robert F., to VRC California, Inc. Memory unit flying pad linkage. 3,914,791, Cl. 360-103.000.

Steele, James R., to Dynamic Air Inc. Air blender for granular materials. 3,913,891, Cl. 259-4.000.

Steelman, Douglas J.: *See—*
Hunt, William E., Jr.; Connin, John L.; and Steelman, Douglas J., 3,914,047.

Stefanka, Joseph Anthony, to Norbalt Rubber Corporation. Apparatus for forming corrugated tubing. 3,914,101, Cl. 425-387.00R.

Stein, Herman Hal; and Prasad, Raj Nandan, to Abbott Laboratories. Method of increasing coronary pO_2 in mammals. 3,914,414, Cl. 424-180.000.

Stein, Herman Hal; and Prasad, Raj Nandan, to Abbott Laboratories. Adenosine-5'-carboxylic acid amides. 3,914,415, Cl. 424-180.000.

Steinbrecher, Lester: *See—*
Hall, Wilbur S.; and Steinbrecher, Lester, 3,914,519.

Steiner, Stephen A.: *See—*
Pao, Henry C.; and Steiner, Stephen A., 3,914,628.

Steinmetz, Hans-Joachim; Rahm, Helmut; and Paap, Karl-Ludwig, to Matth. Hohner AG. Electronic data-processing system and method of operating same. 3,914,746, Cl. 340-172.500.

Stendel, Wilhelm: *See—*
Lorenz, Walter; Hammann, Ingeborg; Behrenz, Wolfgang; and Stendel, Wilhelm, 3,914,243.

Stenstrom, Lennart Arvid, to Alfa-Laval AB. Apparatus for enveloping and treating substances. 3,913,299, Cl. 53-127.000.

Stephens, George C.: *See—*
Rowland, Michael L.; and Stephens, George C., 3,913,343.

Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, to Allied Chemical Corporation. Vehicle sensitive retractor with double pendulum. 3,913,861, Cl. 242-107.400.

Stephenson, Robert L.; Pfeiffer, Robert C.; and Loomba, Yogendra Singh, to Allied Chemical Corporation. Vehicle sensitive retractor with universal dome pendulum. 3,913,862, Cl. 242-107.400.

Sterling Drug Inc.: *See—*
Shaw, Philip E.; Daum, Sol J.; and Clarke, Robert L., 3,914,254.

Sterling, Vaughn C., to General Electric Company. Photoflash lamp primer composition. 3,914,143, Cl. 149-40.000.

Stevens, Keith Drummond: *See—*
Morton, John; Stevens, Keith Drummond; and Thexton, Graham Spencer, 3,914,671.

Stevens, Raymond F. Superheat control system. 3,913,347, Cl. 62-209.000.

Stevens, William M.: *See—*
Adams, James S.; and Stevens, William M., 3,913,153.

Stevenson, James S. Spray rig assembly. 3,913,836, Cl. 239-166.000.

Stewart-Decatur Security Systems, Inc.: *See—*
Butt, Gerald L., 3,913,263.

Stewart, James G.: *See—*
Berliner, Mayer; and Stewart, James G., 3,914,002.

Stiles, John C.: *See—*
Ljung, Bo H. G.; and Stiles, John C., 3,913,405.

Stipanuk, John M., to Sunbeam Corporation. Portable humidifier. 3,914,349, Cl. 261-29.000.

Stipek, Charles J., Jr., to Bates Printing Specialties, Inc. Double die-cut label. 3,914,483, Cl. 428-42.000.

Stirling, James Alexander; and Carlton, Gordon. Mechanical handling of goods. 3,913,764, Cl. 214-621.000.

Stockwell, Gordon Horsford: *See—*
Minett, Herbert Hargrave Basil; and Stockwell, Gordon Horsford, 3,913,833.

Stokes, Paul D.: *See—*
Talmage, Dennis D.; and Stokes, Paul D., 3,914,619.

Stol, Miroslav: *See—*
Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, 3,914,341.

Stonack, George H., to Morton, Max L. Quickly installed tire chain. 3,913,651, Cl. 152-213.00R.

Stone, Gale E.: *See—*
Bigelow, Arthur G.; Bigelow, Wilbur W.; and Stone, Gale E., 3,914,578.

Storzel, Karl: *See—*
Burgdorf, Jochen; Klose, Karl-Heinz; and Storzel, Karl, 3,913,709.

Stout, Karl J., to Raytheon Company. Gamma camera. 3,914,611, Cl. 250-369.000.

Stover, Harry L.; and Leedy, Hayden M., to Hughes Aircraft Company. Bi-state varactor phase modulation network and process for constructing same. 3,914,708, Cl. 332-30.00V.

Stover, William A.: *See—*
Anderson, Conroy D.; Carlson, David W.; Oleck, Stephen M.; and Stover, William A., 3,914,377.

Stoy, Vladimir: *See—*
Kliment, Karel; Chromecek, Richard; Stol, Miroslav; Stoy, Vladimir; and Gavrilova, Eva, 3,914,341.

STP Corporation: *See—*
Scott, Milford M., Jr., 3,913,541.

Strack, Richard R.; and Smith, Merton L., to American Optical Corporation. Method of making improved fiber optic conduit. 3,914,117, Cl. 65-4.000.

Straitz, John F., III, to Combustion Unlimited Incorporated. Vapor disposal system. 3,914,095, Cl. 431-202.000.

Straniti, Salvatore, to Avco Corporation. Two-stage tie-down of turbomachine rotor. 3,914,070, Cl. 416-201.000.

Strauss, Robert F.; and Lawrenz, Carl F., to Service Dynamics, Inc. Trencher tooth construction. 3,913,979, Cl. 299-84.000.

Streckmann, George L., to Medcraft Incorporated. Electrocardiac information monitoring apparatus. 3,913,567, Cl. 128-2.06G.

Striegel nee Kloss, Marlen: *See—*
Flesch, Friedrich; Bappert, Adolf; and Striegel nee Kloss, Marlen, 3,913,733.

Stromberg-Carlson Corporation: *See—*
Comas, Enrique G.; and Root, Bernard H., 3,914,555.
Strybel, Richard V., to Imperial-Eastman Corporation. Flaring tool. 3,913,364, Cl. 72-318.000.
Stuart, Edward B. Dental hygiene product. 3,913,596, Cl. 132-89.000.
Subsea Equipment Associates Ltd.: *See—*
Brun, Andre; Jaffe, Albert; and de Panafieu, Philippe, 3,913,669.
Sucher, Robert William: *See—*
Robbins, Ernest Aleck; Sucher, Robert William; Seeley, Robert Dudley; Schuldt, Erich Henry, Jr.; Newell, Jon Albert; and Sidoti, Daniel Robert, 3,914,450.
Suddeutsche Kuhlerfabrik: *See—*
Nonnenmann, Manfred, 3,914,068.
Suetterlin, Norbert: *See—*
Krieg, Manfred; Suetterlin, Norbert; and Blitz, Hans-Dieter, 3,914,338.
Sugahara, Yujiro; Naito, Hiroyuki; Takahashi, Akira; and Takai, Kiyoshi, to Mizusawa Kagaku Kogyo Kabushiki Kaisha. Process for the preparation of substantially pure phosphorus oxyacid salts of metals of group IV b''. 3,914,381, Cl. 423-305.000.
Sugano, Saburo, to Sony Corporation. Advance warning device. 3,913,519, Cl. 116-114.00J.
Sugiura, Minoru; and Maseki, Kyou-Ichi, to Iwasaki Denki Kabushiki Kaisha. Discharge lamp. 3,914,636, Cl. 313-229.000.
Sugiura, Yoji, to Canon Kabushiki Kaisha. Photographic camera with a mechanical switching system. 3,914,778, Cl. 354-268.000.
Sugiyama, Hiroshi: *See—*
Ikeda, Tsuneo; Sato, Katsunobu; and Sugiyama, Hiroshi, 3,914,273.
Sugiyama, Keiji: *See—*
Muraoka, Hiroshi; Narui, Michinori; and Sugiyama, Keiji, 3,913,221.
Sullivan, James F., to Honeywell Information Systems Inc. High voltage transistorized power supply employing switching regulator and d.c.-a.c. converter circuitry. 3,914,679, Cl. 321-2.000.
Sumi, Yutaka: *See—*
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, 3,914,112.
Sumitomo Chemical Company, Ltd.: *See—*
Ikeda, Tsuneo; Sato, Katsunobu; and Sugiyama, Hiroshi, 3,914,273.
Shima, Takesaburo; Sakamoto, Sukehiko; and Fujii, yoshikazu, 3,914,339.
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.
Sun Chemical Corporation: *See—*
Helding, Norman A., 3,914,594.
Sun Oil Company of Pennsylvania: *See—*
Lindeman, Myrl A., 3,913,377.
Miller, Jaydee W., 3,914,615.
Shawhan, Elbert N., 3,914,694.
Sun Research and Development Co.: *See—*
Kirsch, Francis William; Barmby, David S.; and Potts, John D., 3,914,383.
Sun Ventures, Inc.: *See—*
Dickason, Alan F., 3,914,332.
Sunbeam Corporation: *See—*
Stipanuk, John M., 3,914,349.
Superior Continental Corporation: *See—*
Greene, Clifford E., 3,914,560.
Suppe, Hansjoachim, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Needle-supporting mechanism for pile fabric-producing circular knitting machines. 3,913,356, Cl. 66-93.000.
Supper, Ottmar, to Daimler-Benz Aktiengesellschaft. Heating installation for motor vehicles. 3,913,834, Cl. 237-12.30A.
Surette, James D.: *See—*
Call, Donald H.; Atwood, Elbridge L.; Cary, Joseph A.; and Surette, James D., 3,914,173.
Surmatis, Joseph Donald; and Walser, Armin, to Hoffmann-La Roche Inc. Intermediate for Rhodoxanthin. 3,914,256, Cl. 260-340.900.
Sutton, David M.: *See—*
Wise, Robert T.; and Sutton, David M., 3,913,801.
Sutton, Gary D., to Halliburton Company. Composition and process for the removal of asphaltenic containing organic deposits from surfaces. 3,914,132, Cl. 134-40.000.
Suzuki, Takashi: *See—*
Yonezawa, Kazuo; Nakao, Kaname; Suzuki, Takashi; and Kaneda, Satoshi, 3,914,161.
Suzuki, Tatsuro, to Yupiteru Ongaku Kogyo Kabushikikaisha. Tape driving device. 3,913,814, Cl. 226-187.000.
Svacik, Joseph T., to Armour and Company. Preparation of sliced dried beef product. 3,914,444, Cl. 426-284.000.
Svenska Chokladfabriks Aktiebolaget: *See—*
Sollerud, Soren Elof Mauritz, 3,913,791.
SVIT, narodni podnik: *See—*
Bayer, Oldrich; Snasel, Josef; and Premyslovsky, Jiri, 3,913,466.
Swanson, Carl Loyal W., deceased: *See—*
McCoy, Frederic C.; and Swanson, Carl Loyal W., deceased, 3,914,308.
Swanson, Viola C., executrix: *See—*
McCoy, Frederic C.; and Swanson, Carl Loyal W., deceased, 3,914,308.
Swartz, Charles J.: *See—*
Scott, William P.; and Swartz, Charles J., 3,913,992.
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., to Driltech, Inc. Drill pipe handling and storage device. 3,913,753, Cl. 214-2.500.
Swartz, Richard H.; Pearce, Richard J.; and Bowe, James M., to Driltech Inc. Portable drill pipe magazine. 3,913,754, Cl. 214-2.500.
Sway, Boris. Cigarette having distinct tobacco fillers with inert, porous, noncombustible element interposed therebetween. 3,913,590, Cl. 131-9.000.
Sweeney, Donald J., to McClive, R. Thomas. Mattress foundation unit. 3,913,154, Cl. 5-186.00R.
Sweeney, Richard F.: *See—*
Cunningham, William J.; Sweeney, Richard F.; Yao, Charles C. Y.; and Anello, Louis G., 3,914,326.
Sweeney, William T., to Continental Oil Company. Mounting apparatus. 3,913,401, Cl. 73-299.000.
Swensen, Eugene T. Sensing device. 3,914,309, Cl. 250-569.000.
Swift & Company: *See—*
Pavey, Robert L., 3,914,445.
Swingline, Inc.: *See—*
Barrett, Edward E.; and Pinczewski, Morris, 3,913,817.
Malcik, Frank John; Whittemore, Edward William; and Clark, John Patrick, 3,913,995.
Sybron Corporation: *See—*
Bross, William T., 3,913,583.
Gilson, Anton, 3,914,581.
Syntex Corporation: *See—*
Fried, John H.; and Harrison, Ian T., 3,914,293.
Szarvasi, Etienne; and Fontaine, Louis, to Lipha, Lyonnaise Industrielle Pharmaceutique. Substituted (nitrofuryl-acrylidene) hydrazines with antibacterial properties. 3,914,379, Cl. 424-275.000.
Tabaroni, Roberto: *See—*
Gardini, Mario; and Tabaroni, Roberto, 3,913,203.
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, to Sankyo Company Limited. Benzodiazepine derivatives and process for preparing the same. 3,914,215, Cl. 260-239.30T.
Tada, Junichi: *See—*
Fueki, Shimetomo; Tada, Junichi; Osawa, Kenji; Sakai, Naomi; and Ogawa, Kazuhiro, 3,914,160.
Tada, Tetsuya. Sprayer. 3,913,841, Cl. 239-321.000.
Tadauchi, Masaharu: *See—*
Sasaki, Soji; Tadauchi, Masaharu; and Ito, Takashi, 3,913,387.
Taguchi, Gyota: *See—*
Sakita, Takashi; and Taguchi, Gyota, 3,914,443.
Tait, Malcolm John: *See—*
Finney, David John; Ravenhill, John Richard; and Tait, Malcolm John, 3,914,441.
Tajima, Akira: *See—*
Tanabe, Akira; Tajima, Akira; and Kawamura, Naoto, 3,914,024.
Takada, Juichiro, heir: *See—*
Takada, Takezo, deceased, 3,913,977.
Takada, Juichiro, legal authorized heir: *See—*
Takada, Takezo, deceased, 3,913,860.
Takada, Takezo, deceased (by Takada, Juichiro, legal authorized heir), to Takata Kojyo Co., Ltd. Vehicle safety belt emergency locking retraction reel system. 3,913,860, Cl. 242-107.400.
Takada, Takezo, deceased (by Takada, Juichiro, heir), to Takata Kojyo Co., Ltd. Automatic locking belt supported retractor. 3,913,977, Cl. 297-388.000.
Takagi, Hiromu: *See—*
Tachikawa, Ryuji; Takagi, Hiromu; Kamioka, Toshiharu; Miyadera, Tetsuo; Fukunaga, Mitsunobu; and Kawano, Yoichi, 3,914,215.
Takagi, Masaru, to Sinloihi Company Limited. Process for the preparation of labelled compounds. 3,914,372, Cl. 423-2.000.
Takahashi, Akira: *See—*
Sugahara, Yujiro; Naito, Hiroyuki; Takahashi, Akira; and Takai, Kiyoshi, 3,914,381.
Takahashi, Ryohei; Yokomichi, Isao; Shigehara, Itaru; and Komyoji, Terumasa, to Ishihara Sangyo Kaisha Ltd. Agricultural fungicide. 3,914,240, Cl. 260-295.0CA.
Takahashi, Susumu, to Sansui Electric Co., Ltd. Control circuit with field effect transistors of a gain control amplifier. 3,914,705, Cl. 330-29.000.
Takahashi, Takao: *See—*
Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, 3,913,493.
Takahashi, Yoritaro. Film splice patch. 3,914,491, Cl. 428-137.000.
Takai, Kiyoshi: *See—*
Sugahara, Yujiro; Naito, Hiroyuki; Takahashi, Akira; and Takai, Kiyoshi, 3,914,381.
Takamatsu, Schichird: *See—*
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.
Takano, Eiichi; Takesi, Kunio; and Matsumura, Isao, to Canon Kabushiki Kaisha. Device for observing and photographing the fundus of eye. 3,914,032, Cl. 351-7.000.
Takasago Perfumery Co., Ltd.: *See—*
Akutagawa, Susumu; Kumobayashi, Hidenori; and Komatsu, Akira, 3,914,289.
Takashita, Jiro: *See—*
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, 3,913,429.
Takata Kojyo Co., Ltd.: *See—*
Takada, Takezo, deceased, 3,913,860.

Takada, Takezo, deceased, 3,913,977.
Takatsu, Mitsumune; Ohnishi, Fumio; and Minami, Junichi, to Nissin Shokuhin Kaisha, Ltd. Preparation of cereal foods. 3,914,454, Cl. 426-309.000.
Takatsu, Mitsumune: *See—*
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, 3,914,448.
Takeda, Shinichi; Harada, Tomio; Namie, Koshi; and Hara, Kotaro, to Teijin Hercules Chemical Co., Ltd. Method for the recovery of dimethyl terephthalate and intermediate products thereof. 3,914,287, Cl. 260-475.00R.
Takesi, Kunio: *See—*
Takano, Eiichi; Takesi, Kunio; and Matsumura, Isao, 3,914,032.
Takeuchi, Jikko: *See—*
Watanabe, Hideo; Seki, Yoshivuki; and Takeuchi, Jikko, 3,914,544.
Takeuchi, Shigeo, to Takeuchi Tekko Kabushiki Kaisha. Vehicle cleaning apparatus. 3,913,161, Cl. 15-21.00E.
Takeuchi Tekko Kabushiki Kaisha: *See—*
Takeuchi, Shigeo, 3,913,161.
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, to Nissin Shokuhin Kaisha, Ltd. Process for preparing egg noodles and the resulting product. 3,914,448, Cl. 426-557.000.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, to Hitachi Limited; Hitachi Electronics, Ltd.; and Nippon Hoso Kyokai. Receiver for a still picture broadcasting signal. 3,914,535, Cl. 178-5.80R.
Takezawa, Teruhiro: *See—*
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Yoshio: *See—*
Nakanishi, Shigeaki; Takezawa, Yoshio; and Yamaguchi, Akio, 3,914,472.
Talak, John Frank, to Deere & Company. Oil cooler bypass valve. 3,913,831, Cl. 236-34.500.
Talmage, Dennis D.; and Stokes, Paul D., to Ford Motor Company. Frequency responsive switching circuit. 3,914,619, Cl. 307-129.000.
Tamas, Attila J.: *See—*
Longworth, William F.; and Tamas, Attila J., 3,913,937.
Tamburino, James C.; and Venere, Lawrence A., to International Harvester Company. Rock ejecting and suspension limiting arrangement for dual wheeled vehicles. 3,913,943, Cl. 280-158.00A.
Tanabe, Akira; Tajima, Akira; and Kawamura, Naoto, to Canon Kabushiki Kaisha. Photographic objective having a polyester base color temperature conversion filter. 3,914,024, Cl. 350-196.000.
Tanaka, Kunihiko: *See—*
Iwai, Yoshihiro; and Tanaka, Kunihiko, 3,914,033.
Tanaka, Sakae: *See—*
Kambara, Kenjiro; Tanaka, Sakae; and Miyasita, Satoru, 3,913,755.
Tanaka, Susumu; Enoguchi, Yuji; and Kawabata, Hidetoshi, to Minolta Camera Kabushiki Kaisha. Electrophotographic copying apparatus. 3,914,046, Cl. 355-15.000.
Tang, Yu-Sun: *See—*
Lloyd, Wayne B.; Logan, Dale R.; and Tang, Yu-Sun, 3,914,630.
Tantam, Donald Harry, to British Oxygen Company Limited, The. Vacuum-insulated vessel. 3,913,776, Cl. 220-9.00C.
Tarro, Richard E. Drinking container. 3,913,770, Cl. 215-223.000.
Tashima, Makoto: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.
Taylor, Edward: *See—*
Coucher, Robert G.; and Taylor, Edward, 3,913,795.
Taylor, Glenn R.: *See—*
Kellogg, Walter J.; and Taylor, Glenn R., 3,914,571.
Taylor, Lloyd D.: *See—*
Bedell, Stanley F.; and Taylor, Lloyd D., 3,914,017.
TEAC Corporation: *See—*
Okamoto, Hiroshi, 3,914,668.
Tech, Kurt O.: *See—*
Chynoweth, Lawrence L.; and Tech, Kurt O., 3,914,678.
Technibiotics, Inc.: *See—*
Wolvek, Sidney, 3,913,585.
Teijin Hercules Chemical Co., Ltd.: *See—*
Takeda, Shinichi; Harada, Tomio; Namie, Koshi; and Hara, Kotaro, 3,914,287.
Teja, Mohindar Singh, to Deere & Company. Sealed coupling for exhaust pipe sections. 3,913,955, Cl. 285-337.000.
Tematex S.p.A.: *See—*
Grossi, Oscar, 3,913,176.
Temple, Michael D.: *See—*
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, 3,914,464.
Tempmaster Corporation: *See—*
Dean, Frank J., Jr., 3,913,832.
Tenneco Chemicals, Inc.: *See—*
Rudner, Bernard; and Pauly, Peter Daniel, 3,914,189.
Tennent, Howard G., to Hercules Incorporated. Chemical modification of the surface of pyrolytic graphite. 3,914,509, Cl. 428-408.000.
Tenneson, Milton T.; and Mathews, Arno A. Apparatus for marking panel. 3,913,235, Cl. 33-174.00G.
Terada, Kimio; Fujita, Satoshi; and Yoshida, Noritoki, to Asahi Denka Kogyo Kabushiki Kaisha. Edible water in oil emulsion and method for preparing the same. 3,914,458, Cl. 426-604.000.
Terada, Masaki: *See—*
Takeuchi, Tsuneo; Terada, Masaki; Takatsu, Mitsumune; Minami, Junichi; and Otani, Shohei, 3,914,448.
Terasawa, Yoshio, to Hitachi, Ltd. Multi-layer semiconductor device. 3,914,783, Cl. 357-38.000.
Terunuma, Hiroshi, to Nippon Kogaku K.K. Device for mounting an accessory device to an accessory shoe. 3,914,779, Cl. 354-295.000.
Terzuolo, Giancarlo; and Capetti, Federico, to Societa Nebiolo S.p.A. Printing press with variable speed transfer cylinder. 3,913,478, Cl. 101-232.000.
Texaco Exploration Canada: *See—*
Allen, Joseph Columbus; and Redford, David Arthur, 3,913,672.
Redford, David Arthur; and Allen, Joseph Columbus, 3,913,671.
Texaco Inc.: *See—*
Allen, Joseph Columbus; and Redford, David Arthur, 3,913,672.
Barber, Ernest C., 3,913,673.
Canup, Robert E., 3,913,550.
McCoy, Frederic C.; and Swanson, Carl Loyal W., deceased, 3,914,308.
Paap, Hans J.; and Pitts, Robert W., Jr., 3,914,603.
Redford, David Arthur; and Allen, Joseph Columbus, 3,913,671.
Texas Instruments Incorporated: *See—*
Barton, James B.; and Cheek, Tom F., Jr., 3,914,748.
Benker, Frederick H., Jr., 3,913,375.
Buss, Dennis D.; and Reinberg, Alan R., 3,914,127.
Hubing, James H.; and Mongold, Gerald H., 3,914,715.
Leuschner, Horst, 3,914,698.
Textron Inc.: *See—*
Stanaitis, Peter P., 3,913,649.
Thaler, Kurt; and Neugebauer, Alfred, to Ruhrmann, Ing. Josef, Dr. Gap cutting apparatus for slide fastener chain. 3,913,432, Cl. 83-121.000.
Thelen, Alfred, to Balzers Patent-und Beteiligungs-AG. Wide-band multilayer interference filter. 3,914,023, Cl. 350-164.000.
Theodore, Ares N.: *See—*
Labana, Santokh S.; and Theodore, Ares N., 3,914,333.
Theurer, Josef; and Oellerer, Friedrich, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft mbH. Crib tamping machine. 3,913,490, Cl. 104-12.000.
Thexton, Graham Spencer: *See—*
Morton, John; Stevens, Keith Drummond; and Thexton, Graham Spencer, 3,914,671.
Thomas, Edward, to Lawrence Peska Associates, Incorporated, a part interest. Inflatable float with steering mechanism. 3,913,159, Cl. 9-313.000.
Thomas, Ernest Hilton: *See—*
Ritson, Carl; and Thomas, Ernest Hilton, 3,913,581.
Thomas, Gary F.: *See—*
Turner, Donald B.; and Thomas, Gary F., 3,913,744.
Thomas, J. Stanley L., to Kelsey-Hayes Company. Steering transmission. 3,913,936, Cl. 280-91.000.
Thomasson, David G.; Crosher, Frederick K.; Temple, Michael D.; Bartolmei, Leroy A.; and Seddon, Richard Ian, to Optical Coating Laboratory, Inc. Striped dichroic filter and method for making the same. 3,914,464, Cl. 427-54.000.
Thompson Chemicals, Inc.: *See—*
McFarren, John E., 3,913,894.
Thompson, Edward W. Method and means for reinforcing cementatory matter. 3,913,295, Cl. 52-659.000.
Thompson, Hugh L. Seam buster. 3,913,248, Cl. 38-1.00B.
Thompson, John H.: *See—*
Sims, David S.; and Thompson, John H., 3,914,729.
Thompson, Thomas T. Progressive punch die. 3,913,371, Cl. 72-324.000.
Thompson, Tommy Lewis, to Life Support, Inc. Chlorate candle and method of making same. 3,914,355, Cl. 264-3.00R.
Thomsen, Jack W., to Bell & Howell Company. Web handling apparatus. 3,913,867, Cl. 242-192.000.
Thomson-CSF: *See—*
Corbel, Ange, 3,914,617.
Gigoux, Claude, 3,913,223.
Tinet, Claude, 3,914,595.
Thorn Electrical Industries Limited: *See—*
Clarke, Maurice George, 3,913,999.
Threlkeld, Richard James. Long play film cartridge. 3,913,857, Cl. 242-55.19A.
Tichy, Dieter: *See—*
Schnee, Karl; Piesch, Steffen; and Tichy, Dieter, 3,914,523.
Tietjens, Eduard Willem; and Van Hemmen, Dirk Jan, to U.S. Philips Corporation. Dry shaving apparatus with shear plate biasing means. 3,913,225, Cl. 30-43.600.
Tillman, Philip Robert: *See—*
Coderre, William Michael; Berglund, Carl Neil; and Tillman, Philip Robert, 3,914,642.
Tillson, Robert S., to General Electric Company. Rejection type fuse holder. 3,914,005, Cl. 339-186.00R.
Tinet, Claude, to Thomson-CSF. Optical device for reading-out a track carried by a moving data carrier. 3,914,595, Cl. 250-202.000.
Tiona-Betts, Inc.: *See—*
Hanson, John R., 3,913,601.
Tipton, Lynn L.: *See—*
Billings, William W.; and Tipton, Lynn L., 3,914,625.

Tischer, Kurt: *See—*
Graber, Adolf; and Tischer, Kurt, 3,914,493.
Titeflex: *See—*
Gazda, Chester T.; and Lalikos, James M., 3,913,625.
Tobin, John H.: *See—*
Gavin, David F.; and Tobin, John H., 3,914,325.
Todd, William W.; Ilfrey, William T.; and Lloyd, James R., to Exxon Production Research Company. Marine riser assembly. 3,913,668, Cl. 166-.500.
Togo, Kazushi: *See—*
Yamagata, Mineo; Akamatsu, Akira; and Togo, Kazushi, 3,914,479.
Tokumoto, Tsunenori: *See—*
Yamagishi, Kazuo; Nozawa, Masaaki; and Tokumoto, Tsunenori, 3,914,091.
Tokyo Gas Company Limited: *See—*
Yamagishi, Kazuo; Nozawa, Masaaki; and Tokumoto, Tsunenori, 3,914,091.
Tokyo Shibaura Electric Co., Ltd.: *See—*
Hara, Satoshi; Akino, Morio; and Nakagawa, Keizo, 3,913,856.
Tolnai, Julius L., to Price-Pfister Brass Mfg. Co. Eccentric shear seal cartridge valve. 3,913,612, Cl. 137-454.600.
Tolone, Roberto: *See—*
Fabro, Roberto; and Tolone, Roberto, 3,913,865.
Tomita, Seisuke: *See—*
Imamura, Takaaki; Matsui, Masayuki; Tomita, Seisuke; Makita, Masahiro; Nakajima, Tsunemasa; Chiba, Koji; and Shimazaki, Nobuyoshi, 3,913,652.
Tomlin, Thomas A.: *See—*
Brownlee, Milton A.; and Tomlin, Thomas A., 3,913,826.
Toray Industries, Inc.: *See—*
Miyake, Akihisa; Kondo, Hisao; Nishidoi, Takashi; and Onnagawa, Osamu, 3,914,315.
Nakanishi, Shigeaki; Takezawa, Yoshio; and Yamaguchi, Akio, 3,914,472.
Torelli, Vesperto: *See—*
Gasc, Jean-Claude; and Torelli, Vesperto, 3,914,420.
Torpie, John David: *See—*
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.
Torres, Jorge, to Purolator, Inc. Crashworthy flapper valve. 3,913,603, Cl. 137-68.000.
Torrington Company, The: *See—*
Alling, Richard; and Hull, John R., 3,913,994.
Town Tire Services Limited: *See—*
Himmelman, Larry David, 3,914,367.
Toy, William W. Periscopic viewing system. 3,914,028, Cl. 350-287.000.
Toyo Boseki Kabushiki Kaisha: *See—*
Hayashi, Ikuya; Uno, Keiichi; and Matsuoka, Mikio, 3,914,502.
Toyo Kogyo Co., Ltd.: *See—*
Yoshino, Tsutomu, 3,913,283.
Toyoda, Hisao: *See—*
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, 3,914,112.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Katsutoshi, Kitagawa; Yoshiaki, Adachi; and Katsuyasu, Dono, 3,914,076.
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,325.
Miyao, Takayuki; and Sakai, Toshimitsu, 3,913,418.
Nakamura, Hiroyuki; Kawaguchi, Hiroshi; and Nishiwaki, Kiyoshi, 3,914,736.
Traber, Walter: *See—*
Frick, Wilhelm Ernst; Weiss, Anton G.; Wenger, Thomas; and Traber, Walter, 3,914,310.
Trachtman, Alvin. Puck-type apparatus. 3,913,918, Cl. 273-126.00R.
Travor, Bruce W.; Brown, Samuel L.; and Wenocur, Brian D., to United States of America, Army. Projectile. 3,913,489, Cl. 102-93.000.
Trbovich, Nicholas D.; Robinson, William P.; and Trunzo, Eugene R., to Trbovich, Nicholas D.; and Servotronics, Inc. Mounting for a playing piece projector. 3,913,913, Cl. 273-85.00B.
Treadway, Ronald L.: *See—*
Millhollan, Michael S.; and Treadway, Ronald L., 3,914,620.
Tredinnick, Bruce Charles: *See—*
Fessler, Robert Glenn; and Tredinnick, Bruce Charles, 3,914,193.
Trelleborg Rubber Company, Inc.: *See—*
Andersson, Sven E., 3,913,851.
Trenkler, Hansjorg: *See—*
Hoffken, Erich; Pflipsen, Dieter; and Trenkler, Hansjorg, 3,913,950.
Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. [(Thiophosphonothio)acetamido]cephalosporin derivatives. 3,914,221, Cl. 260-243.00C.
Tribe, Leonard T.: *See—*
Every, Peter; and Tribe, Leonard T., 3,913,984.
Trimble, J. B.: *See—*
Parker, George, Sr., 3,914,115.
Trimnell, Donald; Shasha, Baruch S.; and Doane, William M., to United States of America, Agriculture. Thiolation of polysaccharides. 3,914,214, Cl. 260-216.000.
Triplex Safety Glass Company Limited: *See—*
Jack, Harry Ross Scarlett; and Nobbs, Arthur Joseph, 3,914,119.
Richards, Peter Henry, 3,913,966.
Trunzo, Eugene R.: *See—*
Trbovich, Nicholas D.; Robinson, William P.; and Trunzo, Eugene R., 3,913,913.
TRW Inc.: *See—*
Lubowitz, Hyman R.; and Raech, Harry, Jr., 3,914,334.
MacKenzie, George D.; and Noblett, Michael G., 3,914,514.
Mills, Thomas Gene; and Valino, Beethoven Corpus, 3,913,213.
Tseng, Chien K.: *See—*
Pallos, Ferenc M.; and Tseng, Chien K., 3,914,321.
Tsuboi, Takashi: *See—*
Maki, Naoki; Okuda, Hironori; Tsuboi, Takashi; Miyashita, Takao; and Takahashi, Takao, 3,913,493.
Tsuji, Shoichi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Multihole fuel injection nozzle. 3,913,845, Cl. 239-556.000.
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, to Minolta Camera Kabushiki Kaisha. Shutter control device. 3,914,776, Cl. 354-51.000.
Tsukamoto, Sakichi. Automatic nail polishing device. 3,913,594, Cl. 132-76.400.
Tsukamoto, Tsuneo: *See—*
Furuya, Noboru; Fujimoto, Eiji; Amano, Kenichi; Tsukamoto, Tsuneo; and Sato, Nobuyuki, 3,913,384.
Tsuruta, Shohsuke; Toyoda, Hisao; Kashiwa, Shiroh; Kawabata, Takeshi; and Sumi, Yutaka, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Method for connecting steel frame columns or the like in building construction. 3,914,112, Cl. 29-155.00C.
Tucker, Archie J., to Eastman Kodak Company. Film cartridge. 3,913,737, Cl. 206-408.000.
Tugukuni, Hideyoshi; Kano, Masafumi; and Chikazoe, Yoshihisa, to Dai Nippon Toryo Co., Ltd. Cross-linking coating composition. 3,914,335, Cl. 260-859.00R.
Tums, Valdis M.; and Maxwell, Thomas J., to Union Carbide Corporation. Method of forming any end closure in a hollow shirred food casing. 3,914,447, Cl. 426-390.000.
Tunstall, David Frank: *See—*
Hornby, Michael Robert; and Tunstall, David Frank, 3,914,604.
Turk, Herbert: *See—*
Lenk, Erich; Turk, Herbert; and Schiminski, Herbert, 3,913,852.
Turner, Donald B.; and Thomas, Gary F. Lumber sorter apparatus. 3,913,744, Cl. 209-74.00R.
Turner, Lawrence Alexander; and Peter, Roger, to Fluid Dynamics (Proprietory) Limited. Method and apparatus for controlling water flow from an impounded body of water. 3,913,334, Cl. 61-25.000.
Turner Machinery Limited: *See—*
Holdsworth, Eric, 3,913,360.
Tuss, John J.: *See—*
Hart, John E.; Penn, William H., Jr.; and Tuss, John J., 3,913,412.
Twin Disc, Incorporated: *See—*
Groves, Frank W., 3,913,715.
Tyrrell, Philip A.: *See—*
Poister, Clarence E.; Tyrrell, Philip A.; and Hodge, Walter D., 3,913,150.
Uchida, Yoshiro; Matsumura, Yutaka; Nonaka, Tadashi; Hirota, Kinya; Takashita, Jiro; and Ishida, Hisashi, to Hitachi Seiki Co., Ltd. Numerically-controlled lathe with program-controlled tool head. 3,913,429, Cl. 82-2.00B.
Udding, Anne C., to Shell Oil Company. Process for modifying diene polymers. 3,914,211, Cl. 260-94.70N.
Udenfriend, Sidney: *See—*
Okamoto, Yoshiyuki; Riker, Walter Franklin, Jr.; and Udenfriend, Sidney, 3,914,283.
Ueba, Akio: *See—*
Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, 3,914,579.
Ueda, Hiroshi: *See—*
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, 3,914,776.
Uehara, Takashi: *See—*
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.
Ueki, Shiro; and Miyata, Yoshimitsu, to Kabushiki Kaisha Oki Yuka Goeishi Kenkyujo. Process for producing fine fibrous structures. 3,914,354, Cl. 264-13.000.
Uitti, Paul M.; and Mastin, William H., Jr., to Rajay Industries, Inc. Simplified turbo charger system for aircraft. 3,913,542, Cl. 123-119.00C.
Union Carbide Corporation: *See—*
Beatty, Theodore R.; and Vourlis, Harry, 3,914,521.
DeShazer, Larry G., 3,914,018.
Kamp, Ewald A., 3,914,080.
Miller, Walter A.; and Jenkinson, Richard D., 3,914,501.
Scott, Robert J., 3,914,191.
Tums, Valdis M.; and Maxwell, Thomas J., 3,914,447.
Unisearch Limited: *See—*
Chaikin, Malcolm; and Nossar, Mstislav, 3,913,241.
Unistrut Corporation: *See—*
Papayoti, Hristo V., 3,914,063.
United Aircraft Corporation: *See—*
Ballard, Norman D.; and Zubeckis, John, 3,914,170.

Brennan, John J.; Novak, Richard C.; and De Crescente, Michael A., 3,914,500.
Green, Herbert; Guarino, Robert A.; and Fitzgerald, John H., 3,914,763.
United Electric Controls Company: *See—*
Reis, Robert D., 3,914,770.
United Kingdom Atomic Energy Authority: *See—*
Williams, Raymond, 3,913,989.
United States Banknote Corporation: *See—*
Miller, Hobson F., 3,913,789.
United States of America
Agriculture: *See—*
Berni, Ralph J.; Benerito, Ruth R.; and Pilkington, Mary W., 3,914,108.
Bowers, William S., 3,914,429.
Chance, Leon H., 3,914,106.
Portnoy, Norman A.; Reine, Alden H.; and Arthur, Jett C., Jr., 3,914,109.
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,914,260.
Trimnell, Donald; Shasha, Baruch S.; and Doane, William M., 3,914,214.
Air Force: *See—*
Bennett, Willard H., 3,914,637.
Eklund, Phillip R., 3,913,990.
Harada, Yoshiro; and Crandall, William B., 3,914,184.
Kaufman, Irving, 3,914,597.
Pull, Heino L.; and Rezabek, Paul F., Jr., 3,913,997.
Army: *See—*
Bigbie, Claude R., 3,914,610.
Dunetz, Bryant R.; and Kronman, Seymour, 3,913,488.
F'Geppert, Erwin, 3,913,713.
Gardner, Carl J., 3,913,484.
Hadden, David R., Jr., 3,914,750.
Hinnergardt, Larry C., 3,914,446.
Huskins, Chester W., 3,914,140.
Huskins, Chester W., 3,914,206.
Johnston, James V., 3,913,406.
Jones, Howard S., Jr., 3,914,767.
Jones, Marvin L.; and Booth, David W., 3,914,139.
Kendall, David P., 3,914,078.
Kosonocky, Stephan; and Post, Lloyd D., 3,913,486.
Miller, Brian S., 3,913,218.
Nimylowycz, Osyp, 3,913,873.
Redman, Charles M., 3,914,600.
Reinnagel, Richard E., 3,914,567.
Sayles, David C., 3,914,141.
Sayles, David C., 3,914,142.
Sinclair, Alex H.; and Otto, Robert J., 3,913,939.
Travor, Bruce W.; Brown, Samuel L.; and Wenocur, Brian D., 3,913,489.
Wolterman, William G., 3,913,483.
Zeller, Sanford S., 3,914,010.
Energy Research and Development Administration: *See—*
Banker, John G.; and Anderson, Robert C., 3,913,657.
Banks, Ridgway M., 3,913,326.
Brumleve, Thomas D.; Hicks, Mearle G.; and Jones, Milton O., 3,914,732.
Cason, John L., Jr.; and Shaw, Carl B., 3,914,612.
Hadeishi, Tetsuo, 3,914,054.
Jepson, Bernhart E., 3,914,373.
Klett, Robert D., 3,914,392.
McCugh, Ralph M., 3,913,599.
Walter, Carl E., 3,913,481.
Energy Research & Development Administration: *See—*
Baldwin, Arlen R.; and Reinhardt, Thomas A., 3,914,133.
Benton, Samuel T.; and Masters, David R., 3,914,371.
Knott, Martin J.; Lewis, Lloyd G.; and Rabe, Herbert H., 3,914,681.
General Counsel - Code GP: *See—*
Currie, James R., 3,914,712.
Health, Education and Welfare: *See—*
Zee-Cheng, Kwang Yuen; and Cheng, Chia-Chung, 3,914,424.
Navy: *See—*
Bolick, R. Glenn, 3,913,870.
Hall, Patrick H., 3,913,319.
Holmes, Daniel D.; and Weiss, Albert, 3,913,485.
Morley, Carl H.; and Burkardt, Lohr A., 3,914,053.
Pietras, Edward F.; and Nelson, Elric J., 3,914,584.
Sims, David S.; and Thompson, John H., 3,914,729.
Warner, Henry L.; Wallace, Henry C.; and Folds, Donald L., 3,914,731.
State: *See—*
Wheeler, Robert G., 3,913,572.
United States: *See—*
Shulman, N. Raphael; and Coleman, Ceceil R., 3,914,400.
U.S. Philips Corporation: *See—*
Diemer, Willem Hildebrand; Zwep, Gerrit; and Mulder, Jan, 3,914,633.
Klomp, Antonius Maria, 3,913,588.
Overall, Colin Douglas; and Washington, Derek, 3,914,634.
Paupy, Jean Pierre, 3,914,646.
Tietjens, Eduard Willem; and Van Hemmen, Dirk Jan, 3,913,225.
Valkestijn, Leonardus Albertus Antonius, 3,914,652.
van de Plassche, Rudy Johan, 3,914,683.
van der Sluys, Willem Ludovicus Nicolaas; and Scheffer, Maarten, 3,913,899.
van Dijk, Cornelis Dionysius, 3,913,430.
Verbeij, Oswald Johannes, 3,914,650.
United States Postal Service: *See—*
Bruckner, Arnold D.; Johnson, Marlyn D.; Rappaport, Marshall A.; and Sevillia, Daniel E., 3,913,827.
United Technologies Corporation: *See—*
LeFebvre, Clarence A., Jr., 3,913,951.
Senatro, Clement A., 3,913,949.
United Wiring & Manufacturing Co., Inc.: *See—*
Rubey, Ulyss Ray, 3,913,630.
Universal Oil Products Company: *See—*
Anderson, Robert F., 3,914,110.
Anderson, Robert F., 3,914,111.
Bloch, Herman S., 3,914,271.
Hausler, Rudolf H., 3,913,378.
Massie, Stephen N., 3,914,307.
University of Delaware: *See—*
Guerrieri, Salvatore A., 3,914,352.
Uno, Keiichi: *See—*
Hayashi, Ikuya; Uno, Keiichi; and Matsuoka, Mikio, 3,914,502.
Unruh, James Bradley: *See—*
Cooper, Donald Walter; and Unruh, James Bradley, 3,914,745.
Upat-Max Langensiepen KG: *See—*
Flesch, Friedrich; Bappert, Adolf; and Striegel nee Kloss, Marlen, 3,913,733.
Updegrove, Louis B., to J. H. Day Company, The. Method and apparatus for drying particulate materials. 3,913,238, Cl. 34-12.000.
Upjohn Company, The: *See—*
Gall, Martin, 3,914,245.
Pike, John E., 3,914,282.
Urmann, Ernst: *See—*
Bayer, Gerhard; Haerter, Manfred; Cherdron, Egon; Fassle, Fritz; Urmann, Ernst; Ruter, Hermann, deceased; Ruter, Elisabeth, heiress; and Ruter, Edla, heiress, 3,913,571.
Usines Decoufle: *See—*
Verjux, Jean, 3,913,724.
Uskokovic, Milan Radoje: *See—*
Gutzwiller, Juerg Albert Walter; and Uskokovic, Milan Radoje, 3,914,235.
USM Corporation: *See—*
Meyer, Engelbert A., 3,914,061.
Usui, Masahiro: *See—*
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.
Utt, Orval L.: *See—*
Cho, Boong Youn; and Utt, Orval L., 3,914,607.
V-8 Electronic Ignition Co.: *See—*
Crisafulli, Peter G., 3,913,549.
Vacmetal Gesellschaft fur Vakuum-Metallurgie mbH: *See—*
Hoffken, Erich; Pflipsen, Dieter; and Trenkler, Hansjorg, 3,913,950.
Vajtay, Leslie. End caps for containers. 3,913,774, Cl. 220-4.00R.
Valan, Kent John, to GAF Corporation. Hair care preparations containing N-vinyl pyrrolidone homo- and copolymers and a quaternized copolymer of vinyl pyrrolidone. 3,914,403, Cl. 424-47.000.
Valentas, Kenneth J.; and Lindl, Willibald M., to General Mills, Inc. Flaked texturized protein. 3,914,455, Cl. 426-447.000.
Valentine, Henry L.; and Valentine, Louis A. Rear wheel drive for a tricycle. 3,913,946, Cl. 280-236.000.
Valentine, Lamar Travis, deceased (by Valentine, Ruth Elaine, executrix), to Welding Processes Company. Welding manipulator. 3,913,820, Cl. 228-25.000.
Valentine, Louis A.: *See—*
Valentine, Henry L.; and Valentine, Louis A., 3,913,946.
Valentine, Ruth Elaine, executrix: *See—*
Valentine, Lamar Travis, deceased, 3,913,820.
Valino, Beethoven Corpus: *See—*
Mills, Thomas Gene; and Valino, Beethoven Corpus, 3,913,213.
Valio Meijerien Keskusosuusliike: *See—*
Kreula, Matti Siimoni; and Moisio, Tauno Vihtori, 3,913,383.
Valkestijn, Leonardus Albertus Antonius, to U.S. Philips Corporation. Color television display apparatus provided with a modulator for generating a correction current for correcting deflection errors. 3,914,652, Cl. 315-371.000.
Van Leer Plastics (U.S.A.) Inc.: *See—*
Ray, Clarence R.; and La Brie, Jack A., 3,913,186.
van de Plassche, Rudy Johan, to U.S. Philips Corporation. Current stabilizing arrangement with resistive-type current amplifier and a differential amplifier. 3,914,683, Cl. 323-1.000.
Vander Ley, Robert J., to Leslie Metal Arts Company, Inc. Drawer mounting mechanism. 3,913,998, Cl. 312-343.000.
van der Sluys, Willem Ludovicus Nicolaas; and Scheffer, Maarten, to U.S. Philips Corporation. Device for supplying oxidant from a pressurized reservoir to a reaction reservoir. 3,913,899, Cl. 266-34.001.
van Dijk, Cornelis Dionysius, to U.S. Philips Corporation. Device for cutting rings from a hollow, thin-walled and elongate cylindrical object. 3,913,430, Cl. 82-82.000.
Van Gilder, Burrows C., to Eltra Corporation. Regulated ferroresonant power supply with soft start. 3,914,685, Cl. 323-20.000.
Vangor, William. Ring-shaped rotary index platforms. 3,913,417, Cl. 74-822.000.
Van Hemmen, Dirk Jan: *See—*
Tietjens, Eduard Willem; and Van Hemmen, Dirk Jan, 3,913,225.

van Laar, Jacobus; Felthuis, Jacob; Weber, Hendrik Gustaaf Otto; and Olivierse, Hendrik, to Hoogovens IJmuiden BV. Apparatus for mixing two gas flows. 3,913,617, Cl. 137-599.000.

Vanlerberghe, Guy: *See—*
Kalopissis, Gregoire; and Vanlerberghe, Guy, 3,914,407.

Vann Signal Devices, Inc.: *See—*
Hook, Glen C., 3,914,755.

van't Hof, Hendrik A.: *See—*
Hobbs, Charles C.; and van't Hof, Hendrik A., 3,914,296.

van Wijngaarden, Ineke: *See—*
Soudijn, Willem; and van Wijngaarden, Ineke, 3,914,238.

Varian Associates: *See—*
Enck, Richard S., Jr.; Goehner, Ronald H.; and Guy, Gordon Noel, 3,914,599.
Gerard, William A., 3,914,644.
Johnson, Floyd O., 3,914,714.

Varios-Fabrieken B.V.: *See—*
Brandsma, Mark, 3,913,821.

Vassal, Louis Jean: *See—*
Maubois, Jean-Louis Joseph; Mocquot, Germain Pierre Charles Gabriel; and Vassal, Louis Jean, 3,914,435.

Vassiliades, Anthony E., to Champion International Corporation. Spot printing of color-forming microcapsules and co-reactant therefor. 3,914,511, Cl. 428-411.000.

VEB Wirkmaschinenbau Karl-Marx-Stadt: *See—*
Grenzendorfer, Dieter; and Hentschel, Hans-Dieter, 3,913,504.
Lindner, Heinz, 3,913,355.

Venere, Lawrence A.: *See—*
Tamburino, James C.; and Venere, Lawrence A., 3,913,943.

Verbeij, Oswald Johannes, to U.S. Philips Corporation. Television display apparatus provided with a circuit arrangement for generating a sawtooth current through a line deflection coil. 3,914,650, Cl. 315-371.000.

Verdier, Henri, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Pneumatic tires. 3,913,653, Cl. 152-397.000.

Vereinigte Flugtechnische Werke-Fokker GmbH: *See—*
Niehaus, Horst, 3,913,394.

Verjux, Jean, to Usines Decoufle. Device for collecting elongated objects. 3,913,724, Cl. 198-20.00C.

Vermont Marble Company: *See—*
Baker, Charles T., 3,913,372.

Versluis, Jan; Rutten, Hendrikus S.; and Kruisman, Gerard, to Shell Oil Company. Single buoy mooring system. 3,913,157, Cl. 9-8.00P.

Vertefeuille, Raymond: *See—*
Einem, Robert E.; and Vertefeuille, Raymond, 3,914,583.

Vetco Offshore Industries, Inc.: *See—*
Ahlstone, Arthur G., 3,913,670.

Vickers Limited: *See—*
Smith, Francis Hughes; and Moore, Derek Stanley, 3,914,057.

Victaulic Co. of Japan, The: *See—*
Kurose, Yukiteru; and Shimizudani, Noriroo, 3,913,382.

Victor Comptometer Corporation: *See—*
Braughler, Guy E.; Fischer, Earl L.; Garmon, Lee F., Jr.; Miller, William J.; and Simpson, Melvin L., 3,913,553.

Videen, Otis R., to Conwed Corporation. Resilient felted fibrous web. 3,914,498, Cl. 428-290.000.

Vilarrubis, Juan, to Nemrod-Metzeler, S.A. Swimming fins. 3,913,158, Cl. 9-309.000.

Vinals, Joaquin F.: *See—*
Chappell, Robert L.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred H., 3,914,322.
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.

Viracola, Joseph R. System including a pressure switch for counting axles and classifying vehicles. 3,914,733, Cl. 340-38.00R.

Visek, Kenneth E.: *See—*
Daniher, Francis A.; and Visek, Kenneth E., 3,914,303.

Visser, Peter J.; and Miller, Richard C., to Clark Equipment Company. Adjustable vehicle frame. 3,913,933, Cl. 280-34.00A.

Vits, Hilmar, to Vits Maschinenbau GmbH. Turning arrangement for sheets superimposed in a stack and having differing front and rear sides. 3,913,906, Cl. 271-91.000.

Vits Maschinenbau GmbH: *See—*
Vits, Hilmar, 3,913,906.

Vittoz, Eric Andre: *See—*
Hammer, Walter; and Vittoz, Eric Andre, 3,914,706.

Vock, Manfred H.: *See—*
Chappell, Robert L.; Shuster, Edward J.; Vinals, Joaquin F.; and Vock, Manfred H., 3,914,322.

Vock, Manfred Hugo: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vinals, Joaquin F.; Quinn, Alton Dewitt; Vock, Manfred Hugo; and Shuster, Edward J., 3,914,227.
Schreiber, William J.; Pittet, Alan O.; Vock, Manfred Hugo; Shuster, Edward J.; and Quinn, Alton Dewitt, 3,914,451.

Vogelgesang, Peter J.; and Lunquist, Frank C., to Minnesota Mining and Manufacturing Company. Device for forming graphics. 3,914,775, Cl. 354-15.000.

Vollmer, Karl-Otto; and Herrmann, Manfred, to Warner-Lambert Company. Phosphoric acid esters of 5-(2-aminoethoxy)-carvacrols. 3,914,343, Cl. 260-945.000.

von Hollen, Richard Frederick, to Combustion Engineering, Inc. Sediment blowdown arrangement for a shell and tube vapor generator. 3,913,531, Cl. 122-32.000.

von Jordan, Wenzel; Barth, Hans-Jorg; Koch, Hans; and Boning, Gunter, to Metallgesellschaft Aktiengesellschaft. Method of removing sulfur dioxide from a dust containing exhaust gas stream. 3,914,387, Cl. 423-242.000.

Von Meyer, William C.: *See—*
Seidel, Michael C.; Von Meyer, William C.; and Greenfield, Stanley E., 3,914,223.

Vorwerk, Richard: *See—*
Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Vorwerk, Richard, 3,913,452.

Vourlis, Harry: *See—*
Beatty, Theodore R.; and Vourlis, Harry, 3,914,521.

VRC California, Inc.: *See—*
Stebe, Robert F., 3,914,791.

Vyhnalek, Milan. Maturing cheese. 3,913,471, Cl. 99-452.000.

W. R. Grace & Co.: *See—*
Cogliano, Joseph A., 3,913,298.

W. Schlafhorst & Co., Maschinenfabrik: *See—*
Raasch, Hans, 3,913,853.

Wacker-Chemie GmbH: *See—*
Nitzsche, Siegfried; Pirson, Ewald; and Roth, Michael, 3,914,476.

Wacker Corporation: *See—*
Opderbeck, Rudolph G., 3,913,409.

Wagner, Rudolf: *See—*
Grooss, Frank August; and Wagner, Rudolf, 3,913,768.

Wahlberg, Eric C.: *See—*
Wahlberg, Grace A.; and Wahlberg, Eric C., 3,913,246.

Wahlberg, Grace A.; and Wahlberg, Eric C. Teaching and learning aid. 3,913,246, Cl. 35-35.00C.

Wakabayashi, Nobel: *See—*
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,914,260.

Wakahara, Shigeo, to Nippon Kogaku K.K. Film frame feed device in a compact motion picture projector. 3,914,036, Cl. 352-194.000.

Wake, Kiyoyasu: *See—*
Nakane, Sunao; and Wake, Kiyoyasu, 3,913,170.

Walchle, David L.; and Haerr, Raymond H., to Xomox Corporation. Combination myringotomy scalpel, aspirator and otological vent tube inserter. 3,913,584, Cl. 128-305.000.

Waldron, James E., to I-T-E Imperial Corporation. Voltage balance relay. 3,914,664, Cl. 317-148.50R.

Waldron, James E., to I-T-E Imperial Corporation. Rate of rise tripping device. 3,914,667, Cl. 317-36.0TD.

Walker, Brooks. Paper clip having a coated inside loop surface. 3,913,181, Cl. 24-67.900.

Walker, Brooks. Safety guard structure. 3,913,413, Cl. 74-612.000.

Walker Forge, Inc.: *See—*
Andresen, Arne O., 3,913,305.

Walker, William: *See—*
Ewanika, Theodore; and Walker, William, 3,913,557.

Wallace, Henry C.: *See—*
Warner, Henry L.; Wallace, Henry C.; and Folds, Donald L., 3,914,731.

Wallin, Gus Waldemar, to Scovill Manufacturing Company. Structural speed control for electric motors. 3,914,673, Cl. 318-325.000.

Wallshein, Melvin. Elastic orthodontic appliances. 3,913,228, Cl. 32-14.00A.

Walser, Armin: *See—*
Surmatis, Joseph Donald; and Walser, Armin, 3,914,256.

Walter, Carl E., to United States of America, Energy Research and Development Administration. Apparatus for reducing shock and overpressure. 3,913,481, Cl. 102-21.600.

Walters, Andrew C.; and Goss, William M., to Fabco, Incorporated. Wedge actuated cutting and/or forming tools. 3,913,438, Cl. 83-529.000.

Wang Laboratories, Inc.: *See—*
Koplow, Harold Stanley; Eberle, Fritz; Ho, Shu-Kuang; and Lesnick, Edward, 3,913,721.

Wapner, Joseph. Card rack and guide assembly. 3,913,923, Cl. 273-148.00A.

Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Vorwerk, Richard, to Combustion Engineering, Inc. Remotely movable platform. 3,913,452, Cl. 91-411.00R.

Ward, Charles Theodore; Mathis, Donald Lee; Radcliff, Frank Taylor; and Ranger, Eugene, to Combustion Engineering, Inc. Remotely movable platform. 3,913,752, Cl. 214-1.0BB.

Ward, Irving A. Tub spout assembly. 3,913,605, Cl. 137-119.000.

Ward, John W.; and Lybrand, Robert A., to A. H. Robins Company, Incorporated. Method of relieving the discomfort of pharyngitis. 3,914,433, Cl. 424-315.000.

Warman, Murray: *See—*
Nahta, Roop; Bernholz, William F.; Redston, John Percy; and Warman, Murray, 3,914,177.

Warner, Henry L.; Wallace, Henry C.; and Folds, Donald L., to United States of America, Navy. Acoustic wavefront processor. 3,914,731, Cl. 340-6.00R.

Warner-Lambert Company: *See—*
Ciaffone, John T., 3,914,576.
Vollmer, Karl-Otto; and Herrmann, Manfred, 3,914,343.

Washburn, Clayton A. Cathode, ray tube structures. 3,914,651, Cl. 315-371.000.

Washington, Derek: *See—*
Overall, Colin Douglas; and Washington, Derek, 3,914,634.

Wastenson, Erik Goran; and Carlsson, Gote Allan, to Hoganas Aktiebolag. Shock absorbing device. 3,913,707, Cl. 188-1.00C.

Watanabe, Hideo; Seki, Yoshivuki; and Takeuchi, Jikko, to Fuji Telecasting Co., Ltd. Apparatus for halographically recording and reproducing picture images on a disc. 3,914,544, Cl. 178-6.800.

Watanabe, Mutsuo: *See—*
Namiki, Ryoichi; Matsuo, Kazunori; and Watanabe, Mutsuo, 3,914,045.

Watkins-Johnson Company: *See—*
Ballonoff, Aaron, 3,913,216.

Watson, Donald W., to Xerox Corporation. Toner image transfer apparatus. 3,914,042, Cl. 355-3.00R.

Watson, George A.; and Bollinger, John J., to Rockwell International Corporation. Timing control circuit for electronic fuel injection system. 3,914,580, Cl. 235-92.0MT.

Watts, Ralph E., to Koppers Company, Inc. Refuse burner apparatus. 3,913,499, Cl. 110-8.00C.

Wayne, Flora. Ironing board attachment. 3,913,878, Cl. 248-311.000.

Weaver, Richard Vroman: *See—*
Scheiber, David Hitz; and Weaver, Richard Vroman, 3,914,128.

Webasto-Werk W. Baier KG: *See—*
Jardin, Hans; Leiter, Robert; and Lutz, Alfons, 3,913,970.
Jardin, Hans, 3,913,972.

Weber, Dietrich, to Krusius Brothers. Scissors made of steel stampings. 3,913,422, Cl. 76-104.00A.

Weber, Hendrik Gustaaf Otto: *See—*
van Laar, Jacobus; Felthuis, Jacob; Weber, Hendrik Gustaaf Otto; and Olivierse, Hendrik, 3,913,617.

Weber, Karl-Heinz: *See—*
Bauer, Adolf; Weber, Karl-Heinz; Danneberg, Peter; and Kuhn, Franz-Josef, 3,914,216.

Weber, Paul Egon, to Bell & Howell Company. Light tunnel for uniformly illuminating an object. 3,913,872, Cl. 240-41.00R.

Wehnelt, Ulrich: *See—*
Preissinger, Karl-Heinz; Wehnelt, Ulrich; Heywang, Hermann; Kobale, Manfred; and Ristow, Dietrich, 3,913,224.

Weil, Ira: *See—*
Lamberti, Vincent; Konort, Mark D.; and Weil, Ira, 3,914,297.

Weil-McLain Company, Inc.: *See—*
Hiller, Trueman W., 3,913,633.
Rowley, William N.; and Ehret, Gordon F., 3,914,072.

Weiland, Carl W. Navigational ice breaking means and vessel therefor. 3,913,511, Cl. 114-42.000.

Weiler, Ernest D.: *See—*
Miller, George A.; Lewis, Sheldon N.; and Weiler, Ernest D., 3,914,301.

Weill, Lawrence R.: *See—*
Gaskill, James R., Jr.; and Weill, Lawrence R., 3,914,589.

Weimer, Ralph E.: *See—*
Brill, Frank D.; and Weimer, Ralph E., 3,913,792.

Weis, Claus D.: *See—*
Schaffner, Karl; Meisels, Alex; Roger, Jean Claude; and Weis, Claus D., 3,914,222.

Weiss, Albert: *See—*
Holmes, Daniel D.; and Weiss, Albert, 3,913,485.

Weiss, Anton G.: *See—*
Frick, Wilhelm Ernst; Weiss, Anton G.; Wenger, Thomas; and Traber, Walter, 3,914,310.

Weiss, Eugene. Shoe rack for a closet. 3,913,745, Cl. 211-34.000.

Weiss, Harry. Dental setup guide and diagnostic instrument. 3,913,230, Cl. 32-32.000.

Weiss, Helmut. Virtual image magnifier system filled with a refractive medium. 3,914,030, Cl. 350-296.000.

Welding Processes Company: *See—*
Valentine, Lamar Travis, deceased, 3,913,820.

Weldy, Winfred E., to Hercules Incorporated. Sized carbon fibers. 3,914,504, Cl. 428-367.000.

Wells, Roy E.: *See—*
Keating, Raymond J.; Shuh, Lewis M.; and Wells, Roy E., 3,913,628.

Wellworthy Limited: *See—*
Hill, Harold Taylor; and Munro, Robert, 3,914,574.

Wendling, John E., to International Harvester Company. Turn signal and hazard warning switch. 3,914,566, Cl. 200-61.270.

Wenger, Thomas: *See—*
Frick, Wilhelm Ernst; Weiss, Anton G.; Wenger, Thomas; and Traber, Walter, 3,914,310.

Wenocur, Brian D.: *See—*
Travor, Bruce W.; Brown, Samuel L.; and Wenocur, Brian D., 3,913,489.

Wentworth, Philip Rossell; and Jeyes, John Anthony, to Lucas Electrical Company Ltd., The. Fuel control systems. 3,913,547, Cl. 123-139.00E.

Wentz, Edward A., to American Chain & Cable Company, Inc. Self loading and unloading vehicle with laterally moveable load transfer means. 3,913,766, Cl. 214-730.000.

Wernick, Jack Harry: *See—*
Bachmann, Klaus Jurgen; Buehler, Ernest; Shay, Joseph Leo; and Wernick, Jack Harry, 3,913,212.

West Chester Chemical Company: *See—*
Nugent, William A.; Williams, William Lloyd; and Bogle, Hugh A., 3,913,889.

West, John C.; and Gunderson, Gary N., to Century Mfg. Co. Quick shunt locking means. 3,914,726, Cl. 336-133.000.

Westell, John R.: *See—*
Roukis, John G.; Kosson, Robert L.; and Westell, John R., 3,913,664.

Western Electric Company, Inc.: *See—*
Cereijo, Manuel Ramon; and Dougherty, Timothy Stephen, 3,914,357.
Dembiak, Matthew R.; and Glosek, John J., 3,914,356.

Western Geophysical Company of America: *See—*
James, Harlan A., 3,914,014.

Western Litho Plate & Supply Co.: *See—*
Parker, Edward H.; Harris, Edward M.; and Meador, Jim D., 3,914,261.

Westfalia Dinnendahl Groppel AG: *See—*
Jager, Heinz, 3,913,848.

Westinghouse Air Brake Company: *See—*
Shaffer, Ronald J., 3,913,328.

Westinghouse Electric Corporation: *See—*
Alliston, William H.; Johnson, Steven J.; and Mutafelija, Boris A., 3,914,795.
Barpal, Isaac R., 3,913,874.
Billings, William W.; and Tipton, Lynn L., 3,914,625.
Clancy, Steven John, 3,914,623.
Czerniejewski, Francis R., 3,914,794.
Dixon, George D.; and Nelson, Hugh A., 3,914,358.
Feldmesser, Howard S., 3,914,697.
Goldstein, Norman P., 3,914,602.
Herchenroeder, Louis W., 3,914,759.
Jones, Charles H.; and Wolfe, Peter N., 3,914,730.
Kellogg, Walter J.; and Taylor, Glenn R., 3,914,571.
Lloyd, Wayne B.; Logan, Dale R.; and Tang, Yu-Sun, 3,914,630.
Malmberg, Paul R., 3,914,608.
Martin, Frank E.; Colston, John R.; and Smith, Norman E., 3,913,576.
Rai-Choudhury, Prosenjit, 3,914,138.
Shallenberger, John M.; Hornak, Leonard P.; and Desmarchais, Walter E., 3,914,613.
Yannone, Robert A.; and Shields, James J., 3,913,314.

Westlin, Karl L., to American Air Filter Company, Inc. High efficiency unit filter. 3,914,116, Cl. 55-500.000.

Westmont Industries: *See—*
Johnson, Ernest D., 3,913,723.

Westvaco Corporation: *See—*
Batcher, Kenneth Ray, 3,914,156.

Wharton Shipping Corporation: *See—*
Kirby, William Everett; and Seymour, David Jackson, 3,913,512.

Wheeler, Robert G., to United States of America, State. Pleated membrane intrauterine contraceptive device. 3,913,572, Cl. 128-130.000.

Wheeling-Pittsburgh Steel Corporation: *See—*
Guskea, Lee, 3,914,100.
Osterholtz, Carl E.; Agostinelli, Edward; and Jagucki, Edward, 3,914,527.

Whetstone, Everett A.: *See—*
Gyongyosi, Laszlo; and Whetstone, Everett A., 3,913,687.

Whirlpool Corporation: *See—*
Benford, Arthur E., 3,913,996.

White, Daniel J.: *See—*
Creegan, Robert M.; and White, Daniel J., 3,914,484.

White, Idas B. Tree clipper. 3,913,641, Cl. 144-34.00E.

Whitsett, Jack W. Abrading device. 3,913,282, Cl. 51-332.000.

Whittemore, Edward William: *See—*
Malcik, Frank John; Whittemore, Edward William; and Clark, John Patrick, 3,913,995.

Widdig, Arno; Kuhle, Engelbert; Sasse, Klaus; Scheinpflug, Hans; Grewe, Ferdinand; Kaspers, Helmut; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Substituted ureidophenyl thioureas. 3,914,284, Cl. 260-470.000.

Wien-Fischamender Metallwarenfabrik Josef Suschny & Sohnne: *See—*
Holzer, Anton, 3,913,815.

Wienand, Michael; Jensen, Klaus; Primessing, Franz; and Alfter, Franz-Werner, to Dynamit Nobel Aktiengesellschaft. Apparatus and method for the continuous production of wound pipes. 3,914,147, Cl. 156-195.000.

Wiener, Morris I., to Rectilinear Research Corporation. Pedestal for a loudspeaker. 3,913,877, Cl. 248-174.000.

Wiggins Teape Research & Development: *See—*
Lewis, Benjamin Stanley, 3,914,470.

Wiklund, Klas Rudolf, to AGA Aktiebolag. Apparatus for use in equipment which measures physical quantities by sensing phased delays in electromagnetic radiation. 3,914,052, Cl. 356-5.000.

Wilbur, Robert Daniel; and Pensack, Joseph Michael, to American Cyanamid Company. Method of using 2-arylimino-1,3-dithietane compounds as growth promotants. 3,914,428, Cl. 424-277.000.

Wilhelm, Robert G., Jr.; and Donoghue, John Francis, to Industrial Nucleonics Corporation. Sheet moving average filter controller. 3,914,585, Cl. 235-151.300.

Willett, Robert Joseph: *See—*
Bonser, Richard Harlan; and Willett, Robert Joseph, 3,914,741.

William H. Rorer, Inc.: *See—*
Douglas, George H.; and Diamond, Julius, 3,914,306.

Williams, Earl P.: *See—*
Fein, Marvin M.; Field, Nathan D.; and Williams, Earl P., 3,914,187.

Williams, Lary Lynn, to Deere & Company. Vehicle instrument panel cover assembly. 3,913,701, Cl. 180-90.000.

Williams, Peter J.: *See—*
Entwistle, Ian D.; Williams, Peter J.; and Devlin, Barry R. J., 3,914,244.

Williams, Raymond, to United Kingdom Atomic Energy Authority. Air bearings. 3,913,989, Cl. 308-9.000.

Williams, Thomas Alan, to Albright & Wilson Limited. Purification of wet process phosphoric acid using methyl-iso-butyl ketone. 3,914,382, Cl. 423-321.00S.

Williams, William A. Static wind speed and direction indicator. 3,913,397, Cl. 73-189.000.

Williams, William Lloyd: *See—*
Nugent, William A.; Williams, William Lloyd; and Bogle, Hugh A., 3,913,889.

Williamson, Harold L., to Littelfuse, Inc. Impulse relay. 3,914,725, Cl. 335-140.000.

Willis, Gordon G.: *See—*
Ivy, John B.; Willis, Gordon G.; and Kelsoe, David C., 3,914,167.

Wilson, Donald: *See—*
Seward, Gerald Hugh; and Wilson, Donald, 3,913,903.

Wilson, Mark L. Dual shower attachment device. 3,913,839, Cl. 239-267.000.

Wilson, Newton R., to Phillips Petroleum Company. Method for forming a parison. 3,914,366, Cl. 264-177.00R.

Wilson, Ora E. Fuel injection engine. 3,913,548, Cl. 123-139.0AY.

Wilton Corporation: *See—*
Kartasuk, Raymond H., 3,913,786.

Wilwerding, Dennis J.: *See—*
Broekstra, Bert; and Wilwerding, Dennis J., 3,914,647.

Windle, Tom J., to Phillips Petroleum Company. Apparatus for measuring wall thickness. 3,913,234, Cl. 33-147.00E.

Windsor, Robert K. Eye dropper device with a mirror. 3,913,575, Cl. 128-233.000.

Winkley, Jerry H., to ACF Industries, Incorporated. Thermo switch arrangement for control of an internal combustion engine. 3,913,539, Cl. 123-117.00A.

Wirt, Leslie S.; and Morrow, Duane L., to Lockheed Aircraft Corporation. Cellular sound absorptive structure. 3,913,702, Cl. 181-33.00G.

Wise, Robert T.; and Sutton, David M., to Big Drum, Inc. Nozzle assembly with suck-back action. 3,913,801, Cl. 222-375.000.

Wisotzky, Reuben; and Petersen, Richard E., to Pandel-Bradford, Inc. Suede-like material of cellular resin having tensile-ruptured cells. 3,914,492, Cl. 428-151.000.

Witzig, Ralph P., to General Foods Corporation. Stabilized frozen thick shake. 3,914,440, Cl. 426-130.000.

Wlezien, Richard A.: *See—*
Hale, Gordon B.; and Wlezien, Richard A., 3,913,693.

Wohl, Lawrence S.: *See—*
Dulien, Frederick M.; and Wohl, Lawrence S., 3,913,291.

Wolber, Robert; and King, Josef, to Gebruder Junghans GmbH. Battery powered timepieces. 3,913,311, Cl. 58-23.00R.

Wolf, Heinz K. Positive lock insert. 3,913,197, Cl. 29-105.00R.

Wolf, Klaus: *See—*
Cappel, Bert; Schuhmann, Siegfried; and Wolf, Klaus, 3,913,479.

Wolfe, Martin E.: *See—*
Barraco, Anthony J.; and Wolfe, Martin E., 3,914,639.

Wolfe, Peter N.: *See—*
Jones, Charles H.; and Wolfe, Peter N., 3,914,730.

Wolfram, Karl-Heinz Arno: *See—*
Dauner, Bertram Wilhelm-Georg; Marx, Helmut Hermann; and Wolfram, Karl-Heinz Arno, 3,913,480.

Wolga, George J.; and McFarlane, Ross A., to Lansing Research Corporation. Instrument for high resolution spectral analysis with large optical throughput. 3,914,055, Cl. 356-75.000.

Wolterman, William G., to United States of America, Army. Grenade with fuze. 3,913,483, Cl. 102-56.000.

Wolters, Gunter, to Gutehoffnungshutte Sterkarade Aktiengesellschaft. Steel producing plant with one or several electric arc furnaces. 3,913,898, Cl. 266-13.000.

Woltersdorf, Otto W., Jr.: *See—*
Cragoe, Edward J., Jr.; and Woltersdorf, Otto W., Jr., 3,914,253.

Wolvek, Sidney, to Technibiotics, Inc. Surgical cutting instrument. 3,913,585, Cl. 128-305.000.

Wood, Donald B.: *See—*
Heilhecker, Joe K.; Wood, Donald B.; and Heintz, Karl O., 3,913,688.

Wood, Joel Paul: *See—*
Coleson, Ronald Bruce; and Wood, Joel Paul, 3,913,494.

Wood, William Laurence, to Davy Powergas Limited. Hydrocarbon recovery process. 3,914,277, Cl. 260-465.300.

Woodall, Roger E.: *See—*
Searle, Robert J. G.; Woodall, Roger E.; and Bull, Michael J., 3,914,274.

Woodstream Corporation: *See—*
Souza, Anthony J.; and Martin, Harlan W., 3,913,258.

Woodward, Robert Burns, to Ciba-Geigy Corporation. New oxabicyclononanes. 3,914,258, Cl. 260-346.20R.

Woomer, Joyce M.: *See—*
Shaw, William H., 3,913,810.

Woomer, Robert E.: *See—*
Shaw, William H., 3,913,810.

Wright, Andrew Charles Walden: *See—*
Newstead, Charles; and Wright, Andrew Charles Walden, 3,913,708.

Wright, Charles S. Self powering temperature compensated rectifier for measuring current. 3,914,689, Cl. 324-119.000.

Wright, Lee A., to Mosier Industries, Inc. Impact damping means for fluid cylinders. 3,913,460, Cl. 92-85.000.

Wright, Thomas H., Jr. Container holder. 3,913,879, Cl. 248-318.000.

Wurl, Donald R., to Eastman Kodak Company. Sheet guide and cooling apparatus. 3,914,097, Cl. 432-59.000.

Wyers, Joseph H., to Fluoroware Systems Corporation. Wafer basket transfer apparatus. 3,913,749, Cl. 214-1.0BD.

Wylot, James Matthew; and Greco, Edgar Joseph, to Eastman Kodak Company. High index optical glass. 3,914,129, Cl. 106-47.00Q.

Xerox Corporation: *See—*
Bar-on, Ari, 3,913,521.
Basu, Samir K.; and Masham, Roger D., 3,914,049.
Berg, Allen Clark; Fargensi, Rudolph; and Lipani, Anthony Frank, 3,914,181.
Braband, Edward C., 3,913,467.
Hamaker, Ralph A.; and Roth, Charles T., 3,914,546.
Hug, William F., 3,914,649.
Jeromin, Lothar S., 3,914,609.
Maksymiak, John, 3,914,460.
McVeigh, James H., 3,914,040.
McVeigh, James H., 3,914,043.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,537.
Perreault, Donald A.; Bedzyk, Victor Lee; Matthews, Larry Richard; Rivers, Roy Wilben; Shuey, David Rollin; and Torpie, John David, 3,914,538.
Pinsler, Heinz W., 3,914,126.
Richter, Johan Christoffer Frederik Carl, 3,913,838.
Watson, Donald W., 3,914,042.

Xomox Corporation: *See—*
Walchle, David L.; and Haerr, Raymond H., 3,913,584.

Yagi, Hideyuki: *See—*
Misawa, Yutaka; and Yagi, Hideyuki, 3,913,217.

Yamada Dobby Co., Ltd.: *See—*
Goishihara, Tsutomu, 3,913,627.

Yamada, Koji: *See—*
Kawahara, Atsushi; and Yamada, Koji, 3,914,543.

Yamagata, Mineo; Akamatsu, Akira; and Togo, Kazushi, to Ajinomoto Co., Inc. Process for manufacturing leather-like materials. 3,914,479, Cl. 427-390.000.

Yamagishi, Kazuo; Nozawa, Masaaki; and Tokumoto, Tsunenori, to Tokyo Gas Company Limited. Combustion method for hydrocarbonic fuels with low emission of nitrogen oxides. 3,914,091, Cl. 431-10.000.

Yamaguchi, Akio: *See—*
Nakanishi, Shigeaki; Takezawa, Yoshio; and Yamaguchi, Akio, 3,914,472.

Yamaguchi, Seiichi. Resilient joint. 3,913,928, Cl. 277-209.000.

Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, to Sumitomo Chemical Company, Limited. Process for preparing aromatic organic isocyanates. 3,914,268, Cl. 260-453.0PC.

Yamakami, Kiyoshi; Akazawa, Osamu; Shibata, Yoshiyuki; and Fujimoto, Nichio, to Daiichi Seiyaku Co., Ltd. Process for producing β-aminopropionitrile. 3,914,280, Cl. 260-465.50R.

Yamane, Hisakichi: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Yamashita, Kazuo: *See—*
Akao, Masatake; and Yamashita, Kazuo, 3,914,467.

Yamashita, Takayoshi: *See—*
Shigemori, Hideto; Ueba, Akio; Fukunaga, Motoaki; Kitakami, Hisashi; and Yamashita, Takayoshi, 3,914,579.

Yanagimachi, Akio: *See—*
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.

Yang, Kang: *See—*
Johnson, Morris A.; and Yang, Kang, 3,914,327.

Yankell, Samuel L., to Menley & James Laboratories, Ltd. Compositions and method for prevention and treatment of gingivitis. 3,914,406, Cl. 424-52.000.

Yannone, Robert A.; and Shields, James J., to Westinghouse Electric Corporation. System and method for operating a gas turbine electric power plant with bypass flow fueling operation to provide improved reliability and extended apparatus life. 3,913,314, Cl. 60-39.140.

Yano, Wataru: *See—*
Asai, Schumkichiro; Kawakatsu, Yasuyuki; Yano, Wataru; Kayamoto, Hisao; Tashima, Makoto; and Minakata, Itsuo, 3,914,195.

Yao, Charles C. Y.: *See—*
Cunningham, William J.; Sweeney, Richard F.; Yao, Charles C. Y.; and Anello, Louis G., 3,914,326.

Yarur, Alfredo F.: *See—*
Yarur, Alfredo S.; Yarur, Alfredo F.; and Yarur, Nicolas J., 3,913,552.

Yarur, Alfredo S.; Yarur, Alfredo F.; and Yarur, Nicolas J. Device having tiltable and rotatable coacting wheels for projecting tennis balls. 3,913,552, Cl. 124-1.000.

Yarur, Nicolas J.: *See—*
Yarur, Alfredo S.; Yarur, Alfredo F.; and Yarur, Nicolas J., 3,913,552.

Yata, Kintaro: *See—*
Tsujimoto, Kayoshi; Yata, Kintaro; Fujii, Yoshifusa; Ueda, Hiroshi; and Matsuda, Motonobu, 3,914,776.

Yazawa, Norihiko: *See*—
Konishi, Yoshihiro; Konno, Kenichi; Yazawa, Norihiko; and Hoshino, Norio, 3,914,713.
Yeda Research and Development Co., Ltd.: *See*—
Gorecki, Marian; and Patchornik, Abraham, 3,914,205.
Yokomichi, Isao: *See*—
Takahashi, Ryohei; Yokomichi, Isao; Shigehara, Itaru; and Komyoji, Terumasa, 3,914,240.
Yonezawa, Kazuo; Nakao, Kaname; Suzuki, Takashi; and Kaneda, Satoshi, to Matsushita Electric Industrial Company. Electroplating solutions for depositing silver alloys and a method of forming silver alloys by electroplating. 3,914,161, Cl. 204-44.000.
Yoon, Young Z. Hydrant with heating and purging means. 3,913,602, Cl. 137-60.000.
Yoshiaki, Adachi: *See*—
Katsutoshi, Kitagawa; Yoshiaki, Adachi; and Katsuyasu, Dono, 3,914,076.
Yoshida, Kazuetsu: *See*—
Kudo, Tetsuichi; Manabe, Toshikatsu; Yoshida, Kazuetsu; Gejyo, Tetsuo; and Seki, Michiharu, 3,914,390.
Yoshida, Noritoki: *See*—
Terada, Kimio; Fujita, Satoshi; and Yoshida, Noritoki, 3,914,458.
Yoshida, Yasutoshi: *See*—
Nishimura, Akira; Akamatsu, Hiroshi; Negoro, Sentaro; and Yoshida, Yasutoshi, 3,913,259.
Yoshida, Yasuyuki: *See*—
Nishio, Yasuhiro; Ohmae, Takashi; and Yoshida, Yasuyuki, 3,914,506.
Yoshihara, Hiroshi: *See*—
Yamahara, Takeshi; Takamatsu, Schichird; Deguchi, Takashi; Usui, Masahiro; Hirose, Kenichi; and Yoshihara, Hiroshi, 3,914,268.
Yoshino, Takehiko: *See*—
Mohri, Katsuo; Masuda, Michio; Takezawa, Teruhiro; Nabeyama, Hiroaki; Yoshino, Takehiko; and Uehara, Takashi, 3,914,536.
Takezawa, Teruhiro; Masuda, Michio; Nabeyama, Hiroaki; Mohri, Katsuo; Fukuda, Masaaki; Kayano, Tatsuo; Uehara, Takashi; Sawabe, Eiichi; Yoshino, Takehiko; Yamane, Hisakichi; and Yanagimachi, Akio, 3,914,535.
Yoshino, Tsutomu, to Toyo Kogyo Co., Ltd. Automatic honing stone expansion device. 3,913,283, Cl. 51-349.000.
Young, Donald S., to Sanders Associates, Inc. Polarized continuous wave crystalline laser. 3,914,710, Cl. 331-94.50C.
Youngstown Steel Door Company: *See*—
Ross, Irving D., Jr., 3,913,269.
Yupiteru Ongaku Kogyo Kabushikikaisha: *See*—
Suzuki, Tatsuro, 3,913,814.
Zadvorny, Alfred Fedorovich: *See*—
Kostjunin, Boris Nikolaevich; Zadvorny, Alfred Fedorovich; Ragutsky, Arnold Mikhailovich; and Starichnev, Vladimir Viktorovich, 3,913,613.
Zahnradfabrik Friedrichshafen AG: *See*—
Holdenried, Willy; and Hamma, Karlmann, 3,913,695.
Zajac, Bruno G., to Qonaar Corporation. Parking meter with increased winding capacity. 3,913,718, Cl. 194-72.000.
Zee-Cheng, Kwang Yuen; and Cheng, Chia-Chung, to United States of America, Health, Education and Welfare. Method for treating P-388 or L-1210 leukemia strains. 3,914,424, Cl. 424-258.000.
Zeile, Karl: *See*—
Koppe, Herbert; Kummer, Werner; Stahle, Helmut; Zeile, Karl; and Engelhardt, Albrecht, 3,914,432.
Zeleny, Richard A.: *See*—
Pitt, Harold M.; Zeleny, Richard A.; and Knoshaug, Wendell E., 3,914,346.
Zell, Dale Richard; and Martin, John Leroy, to AMP Incorporated. Power isolated transmission cable assembly. 3,914,531, Cl. 174-36.000.
Zeller, Sanford S., to United States of America, Army. Liquid long-wave pass filter for high intensity light source. 3,914,010, Cl. 350-3.000.
Zeltser, Melvin J.: *See*—
Litt, Stuart P.; Zeltser, Melvin J.; Giannini, Richard J.; and Frazita, Richard F., 3,914,765.
Zenith Radio Corporation: *See*—
Engel, Christopher M., 3,914,545.
Zero, Itabe I. Undergarment. 3,913,146, Cl. 2-78.00B.
Ziesche, Kurt; and Kulke, Gunter, to Robert Bosch GmbH. Electromechanically controlled fuel injection valve for internal combustion engines. 3,913,537, Cl. 123-32.0AE.
Zimmermann, Jorg: *See*—
Saverin, Eckehard; and Zimmermann, Jorg, 3,914,522.
Zoth, William. Hairdresser's implement. 3,913,591, Cl. 132-9.000.
Zubeckis, John: *See*—
Ballard, Norman D.; and Zubeckis, John, 3,914,170.
Zundel, Weldon P.: *See*—
Koehler, Harold; Zundel, Weldon P.; and Rickard, Robert S., 3,914,374.
Zwep, Gerrit: *See*—
Diemer, Willem Hildebrand; Zwep, Gerrit; and Mulder, Jan, 3,914,633.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER TRIAL VOLUNTARY PROTEST PROGRAM

JANUARY 28, 1975 NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	ISSUE DATE
B 24,017	3,914,140	Oct. 21, 1975	B 362,589	3,914,012	Oct. 21, 1975
B 24,018	3,914,206	Oct. 21, 1975	B 363,892	3,913,395	Oct. 21, 1975
B 64,868	3,914,141	Oct. 21, 1975	B 364,022	3,913,499	Oct. 21, 1975
B 78,331	3,914,142	Oct. 21, 1975	B 365,834	3,914,702	Oct. 21, 1975
B 112,422	3,913,484	Oct. 21, 1975	B 366,589	3,914,719	Oct. 21, 1975
B 150,560	3,913,654	Oct. 21, 1975	B 367,021	3,914,752	Oct. 21, 1975
B 207,272	3,914,123	Oct. 21, 1975	B 367,661	3,914,158	Oct. 21, 1975
B 211,786	3,914,300	Oct. 21, 1975	B 368,392	3,913,812	Oct. 21, 1975
B 220,683	3,914,471	Oct. 21, 1975	B 368,397	3,914,677	Oct. 21, 1975
B 222,188	3,914,739	Oct. 21, 1975	B 369,997	3,913,533	Oct. 21, 1975
B 251,109	3,914,148	Oct. 21, 1975	B 371,805	3,914,433	Oct. 21, 1975
B 251,635	3,914,149	Oct. 21, 1975	B 376,504	3,914,570	Oct. 21, 1975
B 258,687	3,914,221	Oct. 21, 1975	B 376,799	3,913,955	Oct. 21, 1975
B 261,378	3,913,468	Oct. 21, 1975	B 377,833	3,913,884	Oct. 21, 1975
B 262,378	3,914,410	Oct. 21, 1975	B 379,172	3,914,379	Oct. 21, 1975
B 265,727	3,914,479	Oct. 21, 1975	B 379,282	3,913,462	Oct. 21, 1975
B 269,673	3,914,377	Oct. 21, 1975	B 379,955	3,913,157	Oct. 21, 1975
B 278,991	3,914,469	Oct. 21, 1975	B 380,312	3,913,953	Oct. 21, 1975
B 282,081	3,913,483	Oct. 21, 1975	B 380,900	3,913,307	Oct. 21, 1975
B 284,297	3,913,722	Oct. 21, 1975	B 381,632	3,914,732	Oct. 21, 1975
B 285,796	3,914,303	Oct. 21, 1975	B 382,021	3,913,212	Oct. 21, 1975
B 286,499	3,914,129	Oct. 21, 1975	B 383,532	3,914,246	Oct. 21, 1975
B 287,164	3,914,139	Oct. 21, 1975	B 384,658	3,913,452	Oct. 21, 1975
B 292,126	3,914,465	Oct. 21, 1975	B 385,210	3,913,406	Oct. 21, 1975
B 292,140	3,914,340	Oct. 21, 1975	B 387,331	3,913,701	Oct. 21, 1975
B 293,437	3,913,414	Oct. 21, 1975	B 387,761	3,914,245	Oct. 21, 1975
B 303,702	3,914,131	Oct. 21, 1975	B 389,070	3,914,171	Oct. 21, 1975
B 309,207	3,914,743	Oct. 21, 1975	B 389,285	3,914,631	Oct. 21, 1975
B 309,756	3,914,136	Oct. 21, 1975	B 389,639	3,914,626	Oct. 21, 1975
B 315,731	3,914,108	Oct. 21, 1975	B 389,932	3,913,268	Oct. 21, 1975
B 316,239	3,913,546	Oct. 21, 1975	B 389,933	3,913,267	Oct. 21, 1975
B 322,564	3,914,373	Oct. 21, 1975	B 390,679	3,913,668	Oct. 21, 1975
B 323,191	3,914,566	Oct. 21, 1975	B 390,732	3,913,878	Oct. 21, 1975
B 328,164	3,914,703	Oct. 21, 1975	B 391,184	3,914,214	Oct. 21, 1975
B 328,205	3,914,106	Oct. 21, 1975	B 391,210	3,914,220	Oct. 21, 1975
B 328,210	3,914,275	Oct. 21, 1975	B 392,732	3,914,156	Oct. 21, 1975
B 330,828	3,913,589	Oct. 21, 1975	B 392,894	3,914,763	Oct. 21, 1975
B 331,417	3,914,157	Oct. 21, 1975	B 393,163	3,914,535	Oct. 21, 1975
B 336,652	3,914,211	Oct. 21, 1975	B 393,970	3,914,638	Oct. 21, 1975
B 337,442	3,913,658	Oct. 21, 1975	B 394,088	3,914,740	Oct. 21, 1975
B 337,703	3,914,690	Oct. 21, 1975	B 394,300	3,914,159	Oct. 21, 1975
B 341,579	3,913,363	Oct. 21, 1975	B 395,889	3,913,190	Oct. 21, 1975
B 345,422	3,914,392	Oct. 21, 1975	B 396,025	3,913,869	Oct. 21, 1975
B 345,567	3,913,985	Oct. 21, 1975	B 397,527	3,913,488	Oct. 21, 1975
B 346,165	3,913,293	Oct. 21, 1975	B 398,262	3,913,481	Oct. 21, 1975
B 346,585	3,913,820	Oct. 21, 1975	B 398,597	3,913,743	Oct. 21, 1975
B 348,495	3,914,654	Oct. 21, 1975	B 402,555	3,914,688	Oct. 21, 1975
B 348,558	3,914,109	Oct. 21, 1975	B 403,140	3,913,486	Oct. 21, 1975
B 349,177	3,914,033	Oct. 21, 1975	B 403,355	3,913,352	Oct. 21, 1975
B 349,948	3,914,557	Oct. 21, 1975	B 403,990	3,914,684	Oct. 21, 1975
B 350,245	3,914,331	Oct. 21, 1975	B 405,360	3,913,403	Oct. 21, 1975
B 351,055	3,914,074	Oct. 21, 1975	B 406,065	3,914,199	Oct. 21, 1975
B 351,218	3,914,186	Oct. 21, 1975	B 408,749	3,914,116	Oct. 21, 1975
B 351,421	3,914,733	Oct. 21, 1975	B 410,168	3,914,717	Oct. 21, 1975
B 351,493	3,914,758	Oct. 21, 1975	B 411,145	3,914,168	Oct. 21, 1975
B 351,672	3,914,000	Oct. 21, 1975	B 411,633	3,914,741	Oct. 21, 1975
B 351,735	3,913,385	Oct. 21, 1975	B 415,847	3,914,208	Oct. 21, 1975
B 351,863	3,914,700	Oct. 21, 1975	B 418,302	3,913,252	Oct. 21, 1975
B 351,926	3,914,133	Oct. 21, 1975	B 420,016	3,914,572	Oct. 21, 1975
B 351,939	3,913,480	Oct. 21, 1975	B 421,026	3,914,785	Oct. 21, 1975
B 352,934	3,913,692	Oct. 21, 1975	B 421,797	3,914,023	Oct. 21, 1975
B 353,546	3,913,273	Oct. 21, 1975	B 425,035	3,914,025	Oct. 21, 1975
B 354,296	3,914,580	Oct. 21, 1975	B 425,541	3,914,051	Oct. 21, 1975
B 354,889	3,913,204	Oct. 21, 1975	B 428,177	3,914,624	Oct. 21, 1975
B 354,979	3,914,251	Oct. 21, 1975	B 433,587	3,914,567	Oct. 21, 1975
B 355,269	3,914,561	Oct. 21, 1975	B 437,172	3,913,251	Oct. 21, 1975
B 355,510	3,913,704	Oct. 21, 1975	B 437,195	3,914,618	Oct. 21, 1975
B 357,057	3,913,738	Oct. 21, 1975	B 441,024	3,913,629	Oct. 21, 1975
B 357,402	3,914,180	Oct. 21, 1975	B 441,416	3,913,851	Oct. 21, 1975
B 358,244	3,913,411	Oct. 21, 1975	B 442,280	3,914,054	Oct. 21, 1975
B 359,174	3,914,117	Oct. 21, 1975	B 445,471	3,914,711	Oct. 21, 1975
B 359,946	3,914,132	Oct. 21, 1975	B 450,927	3,913,844	Oct. 21, 1975
B 359,947	3,914,653	Oct. 21, 1975	B 455,775	3,914,356	Oct. 21, 1975
B 361,569	3,914,554	Oct. 21, 1975	B 456,346	3,914,531	Oct. 21, 1975

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 21ST DAY OF OCTOBER, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Anderson, Donald R.; and Frisque, Alvin J., to Nalco Chemical Company. Process for rapid dissolving water-soluble vinyl addition polymers using water-in-oil emulsions. Re. 28,576, Cl. 260-29.60H.

B/K Patent Development, Inc.: *See*—
Burch, Lyndon W.; and Burch, Hadley K., Re. 28,578.

Bauer, Robert, to Miles Laboratories, Inc. Indicator for detecting hydrogen peroxide and peroxidative compounds containing alpha naphthoflavone. Re. 28,575, Cl. 252-408.000.

Black and Decker Manufacturing Company, The: *See*—
Wickham, John L.; Wordsworth, Albert G.; and Huffaker, David E., Re. 28,573.

Burch, Hadley K.: *See*—
Burch, Lyndon W.; and Burch, Hadley K., Re. 28,578.

Burch, Lyndon W.; and Burch, Hadley K., to B/K Patent Development, Inc. Snap-acting mechanisms. Re. 28,578, Cl. 200-67.0DA.

Communication Satellite Corporation: *See*—
Schmidt, William G., Re. 28,577.

Frisque, Alvin J.: *See*—
Anderson, Donald R.; and Frisque, Alvin J., Re. 28,576.

Huffaker, David E.: *See*—
Wickham, John L.; Wordsworth, Albert G.; and Huffaker, David E., Re. 28,573.

Iwasaki Tsushinki Kabushiki Kaisha: *See*—
Uchida, Kozo, Re. 28,579.

Miles Laboratories, Inc.: *See*—
Bauer, Robert, Re. 28,575.

Nalco Chemical Company: *See*—
Anderson, Donald R.; and Frisque, Alvin J., Re. 28,576.

Ruoff, Werner H., to Union Carbide Corporation. Fiber reinforced hot pressing molds. Re. 28,574, Cl. 425-78.000.

Schmidt, William G., to Communication Satellite Corporation. Channel reallocation system and method. Re. 28,577, Cl. 179-15.0BA.

Uchida, Kozo, to Iwasaki Tsushinki Kabushiki Kaisha. Integrating network using at least one D-C amplifier. Re. 28,579, Cl. 328-127.000.

Union Carbide Corporation: *See*—
Ruoff, Werner H., Re. 28,574.

Wickham, John L.; Wordsworth, Albert G.; and Huffaker, David E., to Black and Decker Manufacturing Company, The. Speed control and cut-off device. Re. 28,573, Cl. 418-43.000.

Wordsworth, Albert G.: *See*—
Wickham, John L.; Wordsworth, Albert G.; and Huffaker, David E., Re. 28,573.

LIST OF DESIGN PATENTEES

AB Optimus: *See*—
Fladt, John Erik. 237,243.

Aladdin Industries, Inc.: *See*—
Cummings, John S. 237,241.

Armbruster, John C., and J. W. McDonald, to Ethyl Development Corp. Bottle or similar article. 237,252, 10–21–75, Cl. D9—40.

Barry, Robert C., to Cooper Industries, Inc. Display rack for merchandise. 237,233, 10–21–75, Cl. D6—114.

Brosk, Doris. Apron. 237,223, 10–21–75, Cl. D2—227.

Charles, Steven D.: *See*—
Innes, John H., and Charles. 237,260.

Clark, Melvin E. Bumper sticker holder apparatus. 237,250, 10–21–75, Cl. D8—243.

Claxton, Bruce A., to SCM Corp. Toaster-oven. 237,242, 10–21–75, Cl. D7—93.

Cooper Industries, Inc.: *See*—
Barry, Robert C. 237,233.

Cummings, John S., to Aladdin Industries Inc. Insulated pitcher. 237,241, 10–21–75, Cl. D7—64.

Curtis, William R., and D. C. Trimble, to Hercules Inc. Furniture subframe. 237,238, 10–21–75, Cl. D6—193.

Curtis, William R., and D. C. Trimble, to Hercules Inc. Furniture subframe. 237,239, 10–21–75, Cl. D6—193.

Dart Industries, Inc.: *See*—
Mudde, Manus. 237,226.

Duncan, William J., Jr.: *See*—
Mazzola, Sam A., and Duncan. 237,258.

Dunlop Ltd.: *See*—
Holdsworth, John A. 237,246.
Mallett, Roger S. 237,261.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,262, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,263, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,264, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,265, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,266, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,267, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,268, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,269, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,270, 10–21–75, Cl. D13—1.

Edwards, Lindell N., to Universal Modular Structures, Inc. Extruded structural element for buildings. 237,271, 10–21–75, Cl. D13—1.

Ethyl Development Corp.: *See*—
Armbruster, John C., and McDonald. 237,252.

Famolare, Inc.: *See*—
Famolare, Joseph R., Jr. 237,224.

Famolare, Joseph R., Jr., to Famolare, Inc. Shoe. 237,224, 10–21–75, Cl. D2—313.

Fladt, John E., to AB Optimus. Portable, self contained cooking set. 237,243, 10–21–75, Cl. D7—107.

Fuery, Dillon C.: *See*—
Sebel, Harry, Fuery, and Granger. 237,229.

Garrett, Ralph F., Jr. Container for a plurality of vertically stacked toilet tissue rolls. 237,232, 10–21–75, Cl. D6—97.

Gendron, Lester J. Thumb knife. 237,249, 10–21–75, Cl. D8—98.

Granger, Maxwell: *See*—
Sebel, Harry, Fuery, and Granger. 237,229.

Green, Edward L. Table. 237,236, 10–21–75, Cl. D6—179.

Hercules, Inc.: *See*—
Curtis, William R., and Trimble. 237,238–9.

High Precision Inc.: *See*—
Santor, Richard T. 237,248.

Holdsworth, John A., to Dunlop Ltd. Tool used in fitting a tire to a wheel. 237,246, 10–21–75, Cl. D8—31.

Iacurto, John D., and M. S. Levine, to United States Steel Corp. Cabinet or similar article. 237,235, 10–21–75, Cl. D6—167.

Innes, John H., and S. D. Charles, to Intersil Inc. Electronic stop watch. 237,260, 10–21–75, Cl. D10—30.

Intersil Inc.: *See*—
Innes, John H., and Charles. 237,260.

Kahn, Evan R. Brush. 237,225, 10–21–75, Cl. D4—31.

Kaplan, Burton H. Furniture seat. 237,228, 10–21–75, Cl. D6—63.

Kaplan, Burton H., to Rowe Furniture Corp. Chair. 237,230, 10–21–75, Cl. D6—71.

Kemnitzer, Ronald B., to Sunbeam Corp. Pendulum clock housing. 237,259, 10–21–75, Cl. D10—28.

Kretz, Edward J. Jug. 237,254, 10–21–75, Cl. D9—42.

Levine, Marvin S.: *See*—
Iacurto, John D., and Levine. 237,235.

Mahasco Industries, Inc.: *See*—
Mergenov, George. 237,227.

Mallett, Roger S., to Dunlop Ltd. Balance weight. 237,261, 10–21–75, Cl. D10—94.

Mazzola, Sam A., and W. J. Duncan, Jr. Packaging container for food products. 237,258, 10–21–75, Cl. D9—219.

McDonald, John W.: *See*—
Armbruster, John C., and McDonald. 237,252.

Mergenov, George, to Mahasco Industries, Inc. Chair. 237,227, 10–21–75, Cl. D6—37.

Mudde, Manus, to Dart Industries, Inc. Stool. 237,226, 10–21–75, Cl. D6—26.

Nelson, Madeline. Book holder. 237,237, 10–21–75, Cl. D6—184.

Nickleby, Raymond B. Pick up tool. 237,247, 10–21–75, Cl. D8—52.

Paez, Daniel. Picture holder. 237,240, 10–21–75, Cl. D6—234.

Plummer, James E. Jug. 237,255, 10–21–75, Cl. D9—52.

Pretty Products, Inc.: *See*—
Wells, Charles A. 237,231.

Rowe Furniture Corp.: *See*—
Kaplan, Burton H. 237,230.

SCM Corp.: *See*—
Claxton, Bruce A. 237,242.

Santore, Richard T., to High Precision Inc. Chain-saw sharpening tool. 237,248, 10–21–75, Cl. D8—91.
Sebel, Harry, D. C. Fuery, and M. Granger. Moulded chair. 237,229, 10–21–75, Cl. D6—66.
Schweizer, Peter L. Jug. 237,253, 10–21–75, Cl. D9—42.
Scott & Fetzer Co., The: *See*—
Williams, Clyde H. 237,244.
Smyth, Donald N. Combination rake and broom. 237,245, 10–21–75, Cl. D8—6.
Sunbeam Corp.: *See*—
Kemnitzer, Ronald B. 237,259.
Trimble, David C.: *See*—
Curtis, William R., and Trimble. 237,238–9.
United States Steel Corp.: *See*—
Iacurto, John D., and Levine. 237,235.
Universal Modular Structures, Inc.: *See*—
Edwards, Lindell N. 237,262–71.
Weckman, Richard L. Bottle. 237,256, 10–21–75, Cl. D9—60.
Wells, Charles A., to Pretty Products, Inc. Merchandise display rack. 237,231, 10–21–75, Cl. D6—85.
Wertz, Betty J. Well mounted jewelry box. 237,234, 10–21–75, Cl. D6—127.
Williams, Clyde H., to The Scott & Fetzer Co. Upright vacuum cleaner or similar article. 237,244, 10–21–75, Cl. D7—165.

CLASSIFICATION OF PATENTS

ISSUED OCTOBER 21, 1975

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

78B	3,913,146
325	3,913,147

CLASS 3

13	3,913,148

CLASS 4

67A	3,913,149
213	3,913,150
224	3,913,151

CLASS 5

37R	3,913,152
68	3,913,153
186R	3,913,154
327	3,913,155
348R	3,913,156

CLASS 8

116P	3,914,106
158	3,914,107
185	3,914,108
194	3,914,109

CLASS 9

8P	3,913,157
309	3,913,158
313	3,913,159

CLASS 12

142R	3,913,160

CLASS 13

13	3,914,526
30	3,914,527

CLASS 15

21C	3,913,162
21E	3,913,161
75	3,913,163
210R	3,913,164
244R	3,913,165
250.01	3,913,166
250.04	3,913,167
319	3,913,168
369	3,913,169

CLASS 16

58	3,913,170
82	3,913,171
114B	3,913,172
130	3,913,173

CLASS 17

1G	3,913,174
32	3,913,175

CLASS 19

.35	3,913,176
96	3,913,177

CLASS 23

288E	3,914,110
	3,914,111

CLASS 24

16PB	3,913,179
16	3,913,178
31B	3,913,180
67.9	3,913,181
71J	3,913,182
204	3,913,183
230AT	3,913,184
237	3,913,185
245R	3,913,186
255	3,913,187
276	3,913,188

CLASS 28

4N	3,913,189
19	3,913,190
72.2R	3,913,191

CLASS 29

1A	3,913,192
6.2	3,913,193
25.16	3,913,194
25.35	3,913,195
103A	3,913,196
105R	3,913,197
155C	3,914,112
156.4R	3,913,198
156.6	3,913,199
169.5	3,913,200
182.5	3,913,201
182.7	3,914,113
183.5	3,914,114
203MW	3,913,202
211R	3,913,203
241	3,913,204
278	3,913,205
401	3,913,206
413	3,913,207
417	3,913,208
451	3,913,209
455	3,913,210
571	3,913,211
576	3,913,212
577	3,913,213
578	3,913,214
	3,913,215
580	3,913,216
	3,913,217
585	3,913,218
592	3,913,219
597	3,913,220
603	3,913,221
621	3,913,222
625	3,913,223
	3,913,224

CLASS 30

43.6	3,913,225
123.5	3,913,226
181	3,913,227

CLASS 32

14A	3,913,228
15	3,913,229
32	3,913,230
33	3,913,231

CLASS 33

107R	3,913,232
137R	3,913,233
147E	3,913,234
174G	3,913,235
336	3,913,236

CLASS 34

10	3,913,237
12	3,913,238
102	3,913,239
114	3,913,240
122	3,913,241
170	3,913,242

CLASS 35

12B	3,913,244
12Q	3,913,245
35C	3,913,246

CLASS 36

2.5AN	3,913,243

CLASS 37

43E	3,913,247

CLASS 38

1B	3,913,248

CLASS 40

65	3,913,249
78	3,913,250

CLASS 42

49A	3,913,251
90	3,913,252

CLASS 43

6.5	3,913,254
17	3,913,255
17.5	3,913,256
42.09	3,913,257
60	3,913,258
114	3,913,259

CLASS 46

8	3,913,260
98	3,913,261
193	3,913,262

CLASS 49

16	3,913,263
49	3,913,264
141	3,913,265
200	3,913,266
220	3,913,267
	3,913,268
	3,913,269
360	3,913,270

CLASS 51

5C	3,913,272
5R	3,913,271
8SP	3,913,273
58	3,913,274
59R	3,913,275
108BS	3,913,276
165.77	3,913,277
206P	3,913,278
209	3,913,279
307	3,913,280
308	3,913,281
332	3,913,282
349	3,913,283

CLASS 52

11	3,913,284
64	3,913,285
94	3,913,287
127	3,913,288
285	3,913,289
347	3,913,290
403	3,913,291
406	3,913,292
456	3,913,293
518	3,913,294
648	3,913,286
659	3,913,295
694	3,913,296

CLASS 53

32	3,913,297
36	3,913,298
127	3,913,299
287	3,913,300
331.5	3,913,301

CLASS 54

65	3,913,302

CLASS 55

32	3,914,115
500	3,914,116

CLASS 56

14.1	3,913,303
235	3,913,304
303	3,913,305
313	3,913,306
328R	3,913,307

CLASS 57

18	3,913,308
144	3,913,309
156	3,913,310

CLASS 58

23R	3,913,311
50R	3,913,312
138	3,913,313

CLASS 60

39.14	3,913,314
39.18R	3,913,315
39.25	3,913,316
39.28R	3,913,317
39.66	3,913,318
39.72R	3,913,319
202	3,913,320
226R	3,913,321
278	3,913,322
288	3,913,323
405	3,913,324
431	3,913,325
527	3,913,326
585	3,913,327
592	3,913,328
660	3,913,329
678	3,913,330
692	3,913,331

CLASS 61

1R	3,913,332
4	3,913,333
25	3,913,334
46.5	3,913,335
	3,913,336
50	3,913,337
63	3,913,338

CLASS 62

6	3,913,339
45	3,913,340
49	3,913,341
115	3,913,342
137	3,913,343
176	3,913,344
183	3,913,345
197	3,913,346
209	3,913,347
298	3,913,348
352	3,913,349
353	3,913,350
402	3,913,351

CLASS 64

23.5	3,913,352

CLASS 65

4	3,914,117
95	3,914,118
104	3,914,119
229	3,914,120

CLASS 66

60	3,913,353
75	3,913,354
84R	3,913,355
93	3,913,356
95	3,913,357
148	3,913,358

CLASS 68

183	3,913,359

CLASS 69

30	3,913,360

CLASS 70

424	3,913,361
459	3,913,362

CLASS 71

90	3,914,121
92	3,914,122

CLASS 72

10	3,913,363
104	3,913,365
121	3,913,366
148	3,913,367
234	3,913,368
251	3,913,369
318	3,913,364
322	3,913,370
324	3,913,371
349	3,913,372
355	3,913,373
404	3,913,374
463	3,913,375

CLASS 73

5	3,913,376
10	3,913,377
15R	3,913,378
27R	3,913,379
35	3,913,380
45.1	3,913,381
46	3,913,382
52	3,913,383
53	3,913,384
61.1R	3,913,385
67.5R	3,913,386
67.8S	3,913,387
	3,913,388
71.6	3,913,389
80	3,913,390
88.5SD	3,913,392
88.5R	3,913,391
105	3,913,393
118	3,913,394
	3,913,395
143	3,913,396
154	3,913,398
189	3,913,397
229	3,913,399
273	3,913,400
299	3,913,401
343R	3,913,402
362AR	3,913,403
425.4R	3,913,404
505	3,913,405
516R	3,913,406
552	3,913,407

CLASS 74

61	3,913,409
63	3,913,408
217C	3,913,410
360	3,913,411
424.8R	3,913,412
612	3,913,413
710.5	3,913,414
752C	3,913,415
	3,913,416
822	3,913,417
856	3,913,418
857	3,913,419

CLASS 75

1	3,914,123
82	3,914,124

CLASS 76

13	3,913,420
104A	3,913,422
107S	3,913,421

CLASS 81

3R	3,913,423
3.44	3,913,424
9.5A	3,913,425
9.51	3,913,426
53.2	3,913,427
57.43	3,913,428

CLASS 82

2B	3,913,429
82	3,913,430

CLASS 83

100	3,913,431
121	3,913,432
157	3,913,433
163	3,913,434
193	3,913,435
409	3,913,436
478	3,913,437
529	3,913,438
707	3,913,439
745	3,913,440

CLASS 84

1.16	3,913,441
1.19	3,913,442
1.28	3,913,443

CLASS 85

8.3	3,913,444

CLASS 89

35A	3,913,446
35R	3,913,445

CLASS 90

12D	3,913,447

CLASS 91

36	3,913,448
368	3,913,449
390	3,913,450
396	3,913,451
411R	3,913,452
420	3,913,453
491	3,913,454
492	3,913,455
497	3,913,456

CLASS 92

13.3	3,913,457
13.7	3,913,458
23	3,913,459
85	3,913,460
89	3,913,461

CLASS 93

1E	3,913,462
28	3,913,463
36.3	3,913,464
51HW	3,913,466
51R	3,913,465
93DP	3,913,467

CLASS 96

1E	3,914,125
1.5	3,914,126
36	3,914,127
115P	3,914,128

CLASS 98

2.15	3,913,468
55	3,913,469
115VM	3,913,470

CLASS 99

452	3,913,471

CLASS 100

4	3,913,472
5	3,913,473
45	3,913,474
245	3,913,475

CLASS 101

7	3,913,476
211	3,913,477
232	3,913,478
365	3,913,479
415.1	3,913,480

CLASS 102

21.6	3,913,481
32	3,913,482
56	3,913,483
70.2P	3,913,485
70.2R	3,913,484
75	3,913,486
92.1	3,913,487
	3,913,488
93	3,913,489

CLASS 104

12	3,913,490
130	3,913,491
	3,913,492
148SS	3,913,493
172S	3,913,494

CLASS 105

199R	3,913,495
368R	3,913,496
447	3,913,497

CLASS 106

47Q	3,914,129
163	3,914,130
268	3,914,131

CLASS 108

111	3,913,498

CLASS 110

8C	3,913,499
8F	3,913,500
8R	3,913,501

CLASS 111

1	3,913,502
77	3,913,503

CLASS 112

79R	3,913,504
	3,913,505
121.13	3,913,506
153	3,913,507
221	3,913,508
408	3,913,509
410	3,913,510

CLASS 114

42	3,913,511
43.5VC	3,913,512
183R	3,913,513
206R	3,913,514
230	3,913,515

CLASS 115

31	3,913,516
35	3,913,517

CLASS 116

63C	3,913,518
114J	3,913,519

CLASS 118

7	3,913,520
60	3,913,521
419	3,913,522
626	3,913,523
637	3,913,524

CLASS 119

2	3,913,525
5	3,913,526
51R	3,913,527
52B	3,913,528
60	3,913,529
159	3,913,530

CLASS 122

32	3,913,531

CLASS 123

8.31	3,913,532
8.45	3,913,533
	3,913,535
8.49	3,913,534
32AE	3,913,537
32EA	3,913,536
90.46	3,913,538
117A	3,913,539
	3,913,540
119C	3,913,542
119D	3,913,541
122D	3,913,544
122H	3,913,543
136	3,913,545
139AY	3,913,548
139ST	3,913,546

139E 3,913,547
148E 3,913,549
3,913,550
198DB 3,913,551

CLASS 124

1 3,913,552
15 3,913,553
3,913,554
30R 3,913,556

CLASS 126

43 3,913,557
139 3,913,558
263 3,913,559
360R 3,913,560

CLASS 128

2A 3,913,561
2B 3,913,566
2M 3,913,565
2S 3,913,563
2W 3,913,562
3,913,564
2.06G 3,913,567
11 3,913,568
67 3,913,569
87R 3,913,570
91 3,913,571
130 3,913,572
3,913,573
138R 3,913,574
142.2 3,913,575
233 3,913,576
276 3,913,577
287 3,913,578
290W 3,913,579
3,913,580
303.1 3,913,581
3,913,582
303.14 3,913,583
305 3,913,584
3,913,585
325 3,913,586
348 3,913,587
419D 3,913,588

CLASS 130

24 3,913,589

CLASS 131

9 3,913,590

CLASS 132

3,913,591
33 3,913,592
40 3,913,593
76.4 3,913,594
88.7 3,913,595
89 3,913,596
92R 3,913,597

CLASS 134

22R 3,913,555
40 3,914,132

CLASS 135

4R 3,913,598

CLASS 136

83T 3,914,133
134R 3,914,134

CLASS 137

1 3,913,599
6 3,913,600
39 3,913,601
60 3,913,602
68 3,913,603
3,913,604
119 3,913,605
205 3,913,606
271 3,913,607
322 3,913,608
3,913,609
375 3,913,610
453 3,913,611
454.6 3,913,612
494 3,913,613
543.19 3,913,614
3,913,615
580 3,913,616
599 3,913,617
610 3,913,618
614.17 3,913,619
625.64 3,913,620
630.2 3,913,621

CLASS 138

37 3,913,626
121 3,913,622
122 3,913,623
132 3,913,624
140 3,913,625

CLASS 139

75 3,913,627

CLASS 140

82 3,913,628
92.1 3,913,629
123 3,913,630

CLASS 141

3 3,913,631
45 3,913,633
51 3,913,634
83 3,913,635
95 3,913,632
130 3,913,636
151 3,913,637
3,913,638
285 3,913,639
392 3,913,640

CLASS 144

34E 3,913,641
114R 3,913,642
172 3,913,643
208E 3,913,644
218 3,913,645

CLASS 145

46 3,913,646
50A 3,913,647

CLASS 148

144 3,914,135
171 3,914,136
175 3,914,137
186 3,914,138

CLASS 149

19.2 3,914,139
3,914,140
19.3 3,914,141
19.8 3,914,142
40 3,914,143

CLASS 150

1.5R 3,913,648

CLASS 151

38 3,913,649

CLASS 152

210 3,913,650
213R 3,913,651
330L 3,913,654
361R 3,913,652
397 3,913,653

CLASS 156

73.5 3,914,144
98 3,914,145
149 3,914,146
195 3,914,147
306 3,914,148
3,914,149
308 3,914,150
425 3,914,151
446 3,914,152
499 3,914,153
557 3,914,154

CLASS 160

84R 3,913,655
135 3,913,656

CLASS 162

167 3,914,155
347 3,914,156

CLASS 164

62 3,913,657
280 3,913,658
303 3,913,659
348 3,913,660

CLASS 165

3 3,913,661
8 3,913,662
102 3,913,663
105 3,913,664
3,913,665
106 3,913,666
115 3,913,667

CLASS 166

.5 3,913,668
.6 3,913,669
182 3,913,670
252 3,913,671
263 3,913,672
266 3,913,673
270 3,913,674
278 3,913,675
3,913,676
307 3,913,677
310 3,913,678

CLASS 168

8 3,913,679

CLASS 172

2 3,913,680
5 3,913,681
20 3,913,682
240 3,913,683
804 3,913,684

CLASS 173

117 3,913,685

CLASS 174

5R 3,914,529
11R 3,914,528
28 3,914,530
36 3,914,531
119R 3,914,532
126CP 3,914,533

CLASS 175

39 3,913,686
85 3,913,687
320 3,913,688

CLASS 176

87 3,913,689

CLASS 177

25 3,913,690
202 3,913,691

CLASS 178

5.1 3,914,534
5.8R 3,914,535
3,914,536
6 3,914,537
3,914,538
3,914,539
6.6A 3,914,542
6.6R 3,914,541
6.8 3,914,540
3,914,543
3,914,544
7.5R 3,914,545
7.6 3,914,546
7.9 3,914,547
18 3,914,548

CLASS 179

1AL 3,914,550
1G 3,914,549
6R 3,914,551
15AQ 3,914,552
15AT 3,914,553
15BA Re.28,577
15.55R 3,914,554
18FH 3,914,555
18F 3,914,556
84VF 3,914,557
3,914,558
99 3,914,559
170R 3,914,560
175.3A 3,914,561

CLASS 180

5R 3,913,692
3,913,693
3,913,694
6.48 3,913,695
11 3,913,696
14A 3,913,697
66C 3,913,699
66R 3,913,698
82R 3,913,700
90 3,913,701
121 3,913,704

CLASS 181

33G 3,913,702
36D 3,913,705
44 3,913,703

CLASS 184

6.5 3,913,706

CLASS 188

1C 3,913,707
71.9 3,913,708
73.4 3,913,709
79.5GE 3,913,710

CLASS 190

16 3,913,711

CLASS 191

10 3,914,562
32 3,913,712

CLASS 192

70.25 3,913,713
103FA 3,913,715
107R 3,913,716
995 3,913,714

CLASS 194

16 3,913,717
72 3,913,718

CLASS 195

80R 3,914,157
3,914,158

CLASS 197

1R 3,913,719
17 3,913,720
19 3,913,721
54 3,913,722

CLASS 198

16R 3,913,723
20C 3,913,724
23 3,913,725
154 3,913,726
199 3,913,727
202 3,913,729
205 3,913,730
230 3,913,728
261 3,913,731

CLASS 200

42T 3,914,563
51.09 3,914,565
51.1 3,914,564
61.27 3,914,566
61.47 3,914,567
67DA Re.28,578
144B 3,914,568
148A 3,914,569
153J 3,914,570
330 3,914,571

CLASS 202

270 3,914,159

CLASS 204

43S 3,914,160
44 3,914,161
46G 3,914,162
105R 3,914,163
149 3,914,164
159.15 3,914,165
3,914,166
163R 3,914,167
180G 3,914,168
195S 3,914,169
224M 3,914,170

CLASS 206

.83 3,913,732
219 3,913,733
303 3,913,735
320 3,913,736
408 3,913,737
427 3,913,738
434 3,913,739
472 3,913,740
498 3,913,734
508 3,913,741

CLASS 208

135 3,914,171

CLASS 209

11 3,913,742
73 3,913,743
74R 3,913,744
273 3,914,172

CLASS 210

5 3,914,173
31C 3,914,174
73 3,914,175
132 3,914,176

CLASS 211

34 3,913,745
64 3,913,746

CLASS 213

8 3,913,747
3,913,748

CLASS 214

1BB 3,913,750
3,913,752
1BD 3,913,749
1PB 3,913,751
2.5 3,913,753
3,913,754
18V 3,913,755
32 3,913,756
38BA 3,913,757
38BB 3,913,758
77R 3,913,759
83.36 3,913,760
152 3,913,761
505 3,913,763
506 3,913,762
621 3,913,764
701P 3,913,765
730 3,913,766
770 3,913,767
774 3,913,768

CLASS 215

206 3,913,769
223 3,913,770
256 3,913,771
3,913,772

CLASS 219

10.57 3,914,572
76 3,914,573
121EM 3,914,574
121P 3,914,575
214 3,914,576

CLASS 220

3.92 3,913,773
4R 3,913,774
9LG 3,913,775
9C 3,913,776
22.3 3,913,777
23.83 3,913,778
200 3,913,780
203 3,913,781
243 3,913,779
260 3,913,782
300 3,913,733
348 3,913,784
354 3,913,785

CLASS 221

70 3,913,786

CLASS 222

26 3,913,787
64 3,913,788
107 3,913,789
132 3,913,790
139 3,913,791
144.5 3,913,792
165 3,913,793
178 3,913,794
194 3,913,795
238 3,913,796
253 3,913,797
281 3,913,798
326 3,913,799
368 3,913,800
375 3,913,801
400.7 3,913,802
402.11 3,913,803
3,913,804
3,913,805
429 3,913,806
442 3,913,807
494 3,913,809
565 3,913,808

CLASS 224

42.08 3,913,811
42.45B 3,913,810

CLASS 225

2 3,913,812

CLASS 226

21 3,913,813
44 3,913,900
187 3,913,814

CLASS 227

93 3,913,815
95 3,913,816
126 3,913,817

CLASS 228

3.1 3,913,818
4.1 3,913,819
25 3,913,820
216 3,913,821

CLASS 229

23R 3,913,822
31FS 3,913,823
35 3,913,824
38 3,913,825
3,913,826
3,913,827

CLASS 233

27 3,913,828

CLASS 235

54A 3,914,577
61.7B 3,914,579
61.7R 3,914,578
92CT 3,914,581
92MP 3,914,582
92MT 3,914,580
92C 3,914,583
150.2 3,914,584
151.21 3,913,829
151.3 3,914,585
154 3,914,586
156 3,914,587
3,914,588
164 3,914,589
3,914,590
194 3,914,591

CLASS 236

12R 3,913,830
34.5 3,913,831
49 3,913,832
3,913,833

CLASS 237

12.3A 3,913,834
67 3,913,835

CLASS 239

166 3,913,836
198 3,913,837
225 3,913,838
267 3,913,839
284 3,913,840
321 3,913,841
337 3,913,842
338 3,913,843
526 3,913,844
556 3,913,845
597 3,913,846

CLASS 240

26 3,914,592
41R 3,913,872
41.35R 3,914,593
41.35 3,914,594

CLASS 241

46.04 3,913,847
54 3,913,848
55 3,913,849
101.7 3,913,850
300 3,913,851

CLASS 242

18A 3,913,852
25A 3,913,858
35.5R 3,913,853
55.19A 3,913,856
3,913,857
75.4 3,913,854
75.43 3,913,855
84.41 3,913,859
107.4 3,913,860
3,913,861
3,913,862
118.62 3,913,863
125.2 3,913,864
189 3,913,865
191 3,913,866
192 3,913,867
201 3,913,868
206 3,913,869

CLASS 244

3.2 3,913,870
5 3,913,871
149 3,913,873

CLASS 246

182R 3,913,874

CLASS 248

43 3,913,875
74PB 3,913,876
174 3,913,877
311 3,913,878
318 3,913,879
415 3,913,880

CLASS 249

83 3,913,881

CLASS 250

202 3,914,595
203 3,914,596
204 3,914,597
206 3,914,598
207 3,914,599
213VT 3,914,600
226 3,914,601
253 3,914,602
270 3,914,603
272 3,914,604
276 3,914,605
305 3,914,606
308 3,914,607
311 3,914,608
315A 3,914,609
338 3,914,610
369 3,914,611
499 3,914,612
515 3,914,613
3,914,614
531 3,914,615
569 3,914,309
574 3,914,616

CLASS 251

9 3,913,882
25 3,913,883
35 3,913,884
63 3,913,885
215 3,913,886
367 3,913,887

CLASS 252

8.8 3,914,177
12 3,914,178
32.5 3,914,179
58 3,914,180
62.1 3,914,181
78 3,914,182
184 3,914,183
408 Re.28,575
457 3,914,184
546 3,914,185

CLASS 256

10 3,913,888
12.5 3,913,889

CLASS 259

3 3,913,890
4 3,913,891
3,913,892
5 3,913,893
8 3,913,894
118 3,913,895
125 3,913,896
191 3,913,897

CLASS 260

2.5AC 3,914,189
2.5AG 3,914,188
3,914,190
2.5HB 3,914,186
2.5B 3,914,187
2.5E 3,914,191
4R 3,914,192
17R 3,914,193
18N 3,914,195
18R 3,914,194
28.5A 3,914,197
29.6H Re.28,576
29.7H 3,914,196
30.4N 3,914,198
32.8SB 3,914,199
40 3,914,200
45.75R 3,914,201
47EN 3,914,204
47EP 3,914,202
78.4D 3,914,203
79 3,914,205
80.7 3,914,206
85.3R 3,914,207
86.1E 3,914,208
88.3A 3,914,209
94.3 3,914,210

94.7N 3,914,211
209R 3,914,212
210.5 3,914,213
216 3,914,214
239.3A 3,914,217
239.3D 3,914,216
239.3P 3,914,218
239.3T 3,914,215
239.6 3,914,219
240A 3,914,220
243C 3,914,221
247.2A 3,914,222
247.5E 3,914,223
248NS 3,914,224
3,914,225
250AC 3,914,228
250A 3,914,226
250B 3,914,227
256.4F 3,914,229
260 3,914,230
268R 3,914,231
285 3,914,232
3,914,233
3,914,234
288CE 3,914,235
3,914,236
293.55 3,914,237
293.58 3,914,238
295CA 3,914,240
295R 3,914,239
302E 3,914,241
304 3,914,242
307D 3,914,243
3,914,244
308R 3,914,245
309 3,914,246
3,914,247
309.6 3,914,248
3,914,249
315 3,914,250
326NS 3,914,251
326.13R 3,914,253
326.5FM 3,914,252
327M 3,914,254
333 3,914,255
340.9 3,914,256
343.2R 3,914,257
346.2R 3,914,258
3,914,259
348A 3,914,260
349 3,914,261
3,914,262
351 3,914,263
396R 3,914,264
397.3 3,914,265
438.1 3,914,266
453PC 3,914,268
453PH 3,914,269
453P 3,914,267
455A 3,914,270
456P 3,914,272
458 3,914,271
462R 3,914,275
465D 3,914,273
3,914,274
465E 3,914,276
465.3 3,914,277
3,914,278
465.5R 3,914,279
3,914,280
468D 3,914,282
468K 3,914,281
470 3,914,284
471C 3,914,285
472 3,914,283
473G 3,914,286
475R 3,914,287
481R 3,914,288
483 3,914,289
486R 3,914,290
487 3,914,291
488F 3,914,292
512C 3,914,293
519 3,914,294
524M 3,914,295
530R 3,914,296
535P 3,914,297
544M 3,914,298
553A 3,914,300
559AT 3,914,299
561HL 3,914,302
561N 3,914,303
561R 3,914,304
561S 3,914,301
562B 3,914,305
562R 3,914,306
563B 3,914,307
564F 3,914,308
571 3,914,310
577 3,914,311
583H 3,914,312
585.5 3,914,313
586P 3,914,314
586R 3,914,315
3,914,316
592 3,914,317
599 3,914,318
609R 3,914,319
611A 3,914,320
612D 3,914,321
617F 3,914,322
621G 3,914,323
3,914,324
623R 3,914,325
653.5 3,914,326
658R 3,914,327
659A 3,914,328
668R 3,914,329
676R 3,914,330
3,914,331
680E 3,914,332
836 3,914,333
3,914,334
859R 3,914,335
863 3,914,336
876R 3,914,337
3,914,338
880R 3,914,339
884 3,914,340
885 3,914,341
897A 3,914,342
945 3,914,343
953 3,914,344
970 3,914,345
973 3,914,346

CLASS 261

1 3,914,353
23A 3,914,347
3,914,348
29 3,914,349
65 3,914,350
98 3,914,351
114TC 3,914,352

CLASS 264

3R 3,914,355
13 3,914,354
40 3,914,356
3,914,357
41 3,914,358
45.3 3,914,359
45.4 3,914,361
51 3,914,360
75 3,914,362
105 3,914,363
117 3,914,364
147 3,914,365
177R 3,914,366
219 3,914,367
3,914,368
225 3,914,369
297 3,914,370
332 3,914,371

CLASS 266

13 3,913,898
34T 3,913,899

CLASS 267

34 3,913,901

CLASS 269

8 3,913,902
100 3,913,903

CLASS 270

30 3,913,904

CLASS 271

64 3,913,905
91 3,913,906

CLASS 272

57R 3,913,907
84 3,913,908

CLASS 273

1E 3,913,909
73A 3,913,912
73C 3,913,911
85B 3,913,913
85R 3,913,914
88 3,913,915
103 3,913,916
106.5C 3,913,917
126R 3,913,918
130H 3,913,919
134GM 3,913,920
135B 3,913,921
143R 3,913,922
148A 3,913,923
157R 3,913,910

CLASS 277

37 3,913,924
75 3,913,925
96 3,913,926
166 3,913,927
209 3,913,928

CLASS 280

7.14 3,913,929
11.35N 3,913,930
11.35R 3,913,931
34A 3,913,933
3,913,934
36R 3,913,935
91 3,913,936
104.5A 3,913,937
112A 3,913,938
124A 3,913,932
3,913,941
124F 3,913,939
124R 3,913,940
150.5 3,913,942
158A 3,913,943
231 3,913,944
233 3,913,945
236 3,913,946
3,913,947
415R 3,913,948

CLASS 285

14 3,913,949
55 3,913,950
223 3,913,951
281 3,913,952
290 3,913,953
305 3,913,954
337 3,913,955
343 3,913,956

CLASS 292

57 3,913,957
251.5 3,913,958
256.6 3,913,959
256.65 3,913,960
290 3,913,961
292 3,913,962

CLASS 293

15 3,913,963

CLASS 294

64R 3,913,964
67R 3,913,965
118 3,913,966

CLASS 296

1R 3,913,967
23R 3,913,968
100 3,913,969
137B 3,913,971
137F 3,913,970
3,913,972

CLASS 297

127 3,913,973
195 3,913,974
307 3,913,975
345 3,913,976
388 3,913,977
445 3,913,978

CLASS 299

84 3,913,979

CLASS 301

5BA 3,913,980
36R 3,913,981
45 3,913,982

CLASS 303

21F 3,913,983
3,913,984

CLASS 305

11 3,913,985
27 3,913,987
57 3,913,986

CLASS 307

56 3,914,617
88.3 3,914,618
113 3,914,621
129 3,914,619
215 3,914,620
229 3,914,623
3,914,624
235B 3,914,626
235R 3,914,625
238 3,914,627
270 3,914,628
288 3,914,622

CLASS 308

8.2 3,913,988
9 3,913,989
72 3,913,990
144 3,913,991
187 3,913,992
196 3,913,993
235 3,913,994

CLASS 310

46 3,914,629
61 3,914,630
75 3,914,631
234 3,914,632

CLASS 312

183 3,913,995
214 3,913,996
223 3,913,997
343 3,913,998

CLASS 313

32 3,914,633
105 3,914,634
226 3,914,635
229 3,914,636
230 3,914,637
270 3,914,638
271 3,914,639
315 3,914,640
411 3,914,641
514 3,914,642
519 3,914,643

CLASS 315

39.61 3,914,644
89 3,914,645
103 3,914,646
241P 3,914,647
3,914,648
241R 3,914,649
371 3,914,650
3,914,651
3,914,652
389 3,914,653
408 3,914,654

CLASS 316

4 3,913,999
20 3,914,000

CLASS 317

4 3,914,655
9R 3,914,656
36TD 3,914,667
61.5 3,914,657
99 3,914,658
103 3,914,659
118 3,914,660
3,914,661
124 3,914,662
142R 3,914,663
148.5R 3,914,664
157.6 3,914,665
261 3,914,666

CLASS 318

7 3,914,668
135 3,914,669
3,914,670
139 3,914,671
246 3,914,672
325 3,914,673
331 3,914,674
453 3,914,675
467 3,914,676
561 3,914,677
568 3,914,678

CLASS 321

2 3,914,679
18 3,914,680
40 3,914,681
47 3,914,682

CLASS 323

1 3,914,683
4 3,914,684
20 3,914,685

CLASS 324

10 3,914,686
51 3,914,687
71R 3,914,688
119 3,914,689
158D 3,914,690

CLASS 325

42 3,914,691
53 3,914,692
134 3,914,693
145 3,914,694
3,914,695
422 3,914,696

CLASS 328

67 3,914,697
105 3,914,698
127 Re.28,579
3,914,699
141 3,914,700
151 3,914,701

CLASS 330

13 3,914,702
17 3,914,703
18 3,914,704
29 3,914,705

CLASS 331

1A 3,914,706
4 3,914,707
94.5C 3,914,710
94.5 3,914,709
108D 3,914,711
111 3,914,712

CLASS 332

30V 3,914,708

CLASS 333

21R 3,914,713
22R 3,914,714
24R 3,914,715
28T 3,914,716
30R 3,914,717
3,914,718
71 3,914,719

CLASS 335

14 3,914,720
44 3,914,722
79 3,914,723
112 3,914,724
140 3,914,725

CLASS 336

133 3,914,726

CLASS 338

22R 3,914,727
119 3,914,728

CLASS 339

14R 3,914,001
16R 3,914,002
26 3,914,003
97R 3,914,004
104 3,914,014
186R 3,914,005
198M 3,914,006
255P 3,914,007
259R 3,914,008
278C 3,914,009

CLASS 340

3R 3,914,729
3,914,730
6R 3,914,731
15 3,914,732
38R 3,914,733
52A 3,914,734
52C 3,914,736
52F 3,914,735
55 3,914,737
63 3,914,738
72 3,914,739
146.1C 3,914,741
146.1E 3,914,740
146.3F 3,914,742
147R 3,914,743
172.5 3,914,744
3,914,745
3,914,746
3,914,747
173R 3,914,748
3,914,749
3,914,750
174TF 3,914,751
242 3,914,752
258B 3,914,753
267R 3,914,754
274 3,914,755
280 3,914,756
310A 3,914,757
336 3,914,758
347AD 3,914,760
347SY 3,914,759
366B 3,914,761

CLASS 343

6.5SS 3,914,762
7.7 3,914,763
100PE 3,914,764
106D 3,914,765
701 3,914,766
708 3,914,767
779 3,914,768
911L 3,914,769

CLASS 346

17 3,914,770
74ES 3,914,771
75 3,914,772
121 3,914,773

CLASS 350

3 3,914,010
50 3,914,011
75 3,914,012
96B 3,914,013
96C 3,914,015
154 3,914,017
155 3,914,018
157 3,914,019
160LC 3,914,020
3,914,021
3,914,022
164 3,914,023
196 3,914,024
229 3,914,025
255 3,914,026
267 3,914,027
287 3,914,028
289 3,914,029
296 3,914,030
298 3,914,031

CLASS 351

7 3,914,032

CLASS 352

87 3,914,033
142 3,914,034
191 3,914,035
194 3,914,036

CLASS 353

26 3,914,037
89 3,914,038
114 3,914,039

CLASS 354

5 3,914,774
15 3,914,775
51 3,914,776
196 3,914,777
268 3,914,778
295 3,914,779

CLASS 355

3R 3,914,040
3,914,041
3,914,042
4 3,914,043
6 3,914,048
8 3,914,044
15 3,914,045
3,914,046
16 3,914,047
35 3,914,721
68 3,914,049
133 3,914,050

CLASS 356

2 3,914,051
5 3,914,052
37 3,914,053
51 3,914,054
75 3,914,055
109 3,914,056
118 3,914,057
197 3,914,058

CLASS 357

37 3,914,780
38 3,914,781
3,914,782
3,914,783
61 3,914,784
63 3,914,785
68 3,914,786

CLASS 358

50 3,914,787
75 3,914,788

CLASS 360

2 3,914,789
63 3,914,790
103 3,914,791
3,914,792
134 3,914,793

CLASS 401

67 3,914,059

CLASS 403

171 3,914,060
197 3,914,061
231 3,914,062
406 3,914,063

CLASS 404

84 3,914,064
123 3,914,065

CLASS 415

151 3,914,066
212 3,914,067

CLASS 416

132 3,914,068
3,914,069
201 3,914,070

CLASS 417

353 3,914,071
423R 3,914,072
500 3,914,073
516 3,914,074

CLASS 418

11 3,914,075
43 Re.28,573
137 3,914,076

CLASS 423

2 3,914,372
3,914,373
25 3,914,374
43 3,914,375
213.5 3,914,376
213.7 3,914,377
242 3,914,378
3,914,387
244 3,913,253
249 3,914,388
263 3,914,389
279 3,914,380
305 3,914,381
321S 3,914,382
328 3,914,383
3,914,384
340 3,914,385
351 3,914,390
364 3,914,391
376 3,914,386
445 3,914,392
447 3,914,393
3,914,394
448 3,914,395
462 3,914,397
483 3,914,398
573 3,914,399
613 3,914,396

CLASS 424

12 3,914,400
19 3,914,401
32 3,914,402
47 3,914,403
48 3,914,404
49 3,914,405

52	3,914,406
63	3,914,407
89	3,914,408
119	3,914,409
131	3,914,410
150	3,914,411
177	3,914,412
180	3,914,413
	3,914,414
	3,914,415
184	3,914,416
219	3,914,417
230	3,914,418
237	3,914,419
243	3,914,420
248	3,914,421
250	3,914,423
258	3,914,424
260	3,914,425
266	3,914,426
273	3,914,427
275	3,914,379
277	3,914,428
278	3,914,429
284	3,914,430
288	3,914,431
304	3,914,432
315	3,914,433
343	3,914,434
CLASS 425	
60	3,914,077
77	3,914,078
78	Re.28,574
80	3,914,079
83	3,914,080
130	3,914,081
192	3,914,082
324R	3,914,083
329	3,914,084
380	3,914,085
387R	3,914,101
392	3,914,102
397	3,914,103
	3,914,104
435	3,914,105
437	3,914,086
451.9	3,914,087
CLASS 426	
40	3,914,435
46	3,914,436
53	3,914,437
61	3,914,438
78	3,914,439
130	3,914,440
248	3,914,422
271	3,914,442
274	3,914,443
284	3,914,444
309	3,914,454
326	3,914,445
385	3,914,446
390	3,914,447
447	3,914,455
461	3,914,449
533	3,914,450
534	3,914,451
549	3,914,452
553	3,914,453
557	3,914,448
565	3,914,441
579	3,914,456
589	3,914,457
604	3,914,458
645	3,914,459
CLASS 427	
14	3,914,460
33	3,914,461
43	3,914,462
54	3,914,463
	3,914,464
82	3,914,465
101	3,914,466
116	3,914,467
137	3,914,468
164	3,914,469
202	3,914,470
250	3,914,471
	3,914,472
255	3,914,473
272	3,914,474
291	3,914,475
337	3,914,476
378	3,914,477
385	3,914,478
390	3,914,479
406	3,914,481
CLASS 428	
31	3,914,482
42	3,914,483
	3,914,484
71	3,914,485
73	3,914,486
93	3,914,487
97	3,914,489
133	3,914,490
137	3,914,491
151	3,914,492
195	3,914,493
247	3,914,494
255	3,914,495
279	3,914,496
288	3,914,497
290	3,914,498
292	3,914,499
295	3,914,500
296	3,914,501
315	3,914,503
336	3,914,502
367	3,914,504
379	3,914,505
385	3,914,506
395	3,914,480
397	3,914,488
404	3,914,507
408	3,914,508
	3,914,509
411	3,914,510
	3,914,511
413	3,914,512
425	3,914,513
426	3,914,514
432	3,914,515
	3,914,516
433	3,914,517
451	3,914,518
457	3,914,519
458	3,914,520
461	3,914,521
513	3,914,522
528	3,914,523
533	3,914,524
539	3,914,525
CLASS 431	
5	3,914,088
7	3,914,089
9	3,914,090
10	3,914,091
66	3,914,092
89	3,914,093
202	3,914,094
	3,914,095
208	3,914,096
CLASS 432	
59	3,914,097
106	3,914,098
121	3,914,099
234	3,914,100
CLASS 444	
1	3,914,794
	3,914,795

CLASSIFICATION OF DESIGNS

D2—	227	237,223
	313	237,224
D4—	31	237,225
D6—	26	237,226
	37	237,227
	63	237,228
	66	237,229
	71	237,230
	85	237,231
	97	237,232
	114	237,233
	127	237,234
	175	237,235
	179	237,236
	184	237,237
	193	237,238
		237,239
	234	237,240
D7—	64	237,241
	93	237,242
	107	237,243
	165	237,244
D8—	6	237,245
	31	237,246
	52	237,247
	91	237,248
	98	237,249
	243	237,250
D9—	28	237,251
	40	237,252
	42	237,253
		237,254
	52	237,255
	60	237,256
	142	237,257
	219	237,258
D10—	28	237,259
	30	237,260
	94	237,261
D13—	1H	237,262
		237,263
		237,264
		237,265
		237,266
		237,267
		237,268
		237,269
		237,270
		237,271
	M	237,273
D22—	27	237,274
D23—	31	237,275
D25—	72	237,272
D26—	1C	237,276
	D	237,277
	5C	237,278
		237,279
		237,280
	14A	237,281
	R	237,282
D30—	1	237,283
	9	237,284
D31—	23	237,285
D34—	5GH	237,289
	SS	237,290
	J	237,286
	15HH	237,291
	F	237,287
		237,288
D35—	2B	237,292
		237,293
D48—	20E	237,294
		237,295
	32B	237,297
	R	237,296
D54—	2B	237,298
D55—	1	237,299
		237,300
		237,301
		237,302
		237,303
		237,304
		237,305
		237,306
D56—	4	237,307
		237,308
D61—	1J	237,309
D64—	11A	237,311
	B	237,310
D65—	1R	237,312
D83—	F	237,314
	S	237,313
	U	237,315
		237,316
		237,317
D87—	R	237,318
D95—	3A	237,320
		237,321
		237,322
	B	237,[illegible]

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

3,914,211	3,913,419	3,913,894	3,914,550	3,913,531	3,913,642
3,914,325	3,913,420	3,913,907	3,914,562	3,913,569	3,913,734
1 : 3,913,149	3,913,427	3,913,910	3,914,563	3,913,611	3,913,753
3,913,406	3,913,433	3,913,912	3,914,573	3,913,797	3,913,754
3,913,825	3,913,440	3,913,934	3,914,578	3,913,949	3,913,758
3,913,826	3,913,441	3,913,936	3,914,580	3,913,958	3,913,816
3,914,141	3,913,442	3,913,945	3,914,583	3,913,994	3,913,839
3,914,142	3,913,444	3,913,947	3,914,586	3,914,005	3,913,879
3,914,612	3,913,457	3,913,951	3,914,587	3,914,008	3,913,957
3,914,712	3,913,481	3,913,961	3,914,589	3,914,070	3,913,969
2 : 3,914,074	3,913,485	3,913,962	3,914,592	3,914,218	3,914,355
3 : 3,913,483	3,913,494	3,913,973	3,914,599	3,914,255	3,914,438
3,913,580	3,913,518	3,913,974	3,914,609	3,914,275	3,914,731
3,914,104	3,913,520	3,913,981	3,914,610	3,914,362	13 : 3,913,171
4 : 3,913,345	3,913,522	3,914,010	3,914,618	3,914,389	3,913,274
3,913,361	3,913,523	3,914,013	3,914,622	3,914,423	3,914,009
3,913,564	3,913,541	3,914,015	3,914,639	3,914,426	3,914,155
3,913,976	3,913,542	3,914,018	3,914,649	3,914,442	3,914,357
3,914,137	3,913,554	3,914,030	3,914,658	3,914,481	3,914,690
3,914,597	3,913,559	3,914,035	3,914,676	3,914,576	14 : 3,914,425
3,914,620	3,913,563	3,914,053	3,914,708	3,914,584	15 : 3,913,514
5 : 3,913,463	3,913,603	3,914,054	3,914,714	3,914,614	16 : 3,913,172
3,913,553	3,913,605	3,914,064	3,914,732	3,914,673	17 : Re.28,576
3,913,648	3,913,606	3,914,072	3,914,733	10 : 3,914,122	3,913,174
6 : 3,913,146	3,913,607	3,914,103	3,914,739	3,914,128	3,913,175
3,913,148	3,913,608	3,914,140	3,914,784	3,914,230	3,913,180
3,913,181	3,913,612	3,914,206	3,914,786	3,914,247	3,913,199
3,913,195	3,913,639	3,914,209	3,914,789	3,914,262	3,913,242
3,913,206	3,913,640	3,914,228	3,914,791	3,914,269	3,913,267
3,913,211	3,913,666	3,914,251	8 : 3,913,320	3,914,276	3,913,269
3,913,213	3,913,670	3,914,259	3,913,555	3,914,279	3,913,271
3,913,216	3,913,677	3,914,293	3,913,760	3,914,311	3,913,307
3,913,222	3,913,681	3,914,298	3,913,890	3,914,352	3,913,364
3,913,226	3,913,702	3,914,302	3,913,935	3,914,365	3,913,378
3,913,243	3,913,704	3,914,321	3,914,145	3,914,398	3,913,400
3,913,244	3,913,722	3,914,328	3,914,374	3,914,488	3,913,415
3,913,250	3,913,726	3,914,330	3,914,375	3,914,489	3,913,416
3,913,264	3,913,759	3,914,334	3,914,399	3,914,504	3,913,424
3,913,285	3,913,783	3,914,346	3,914,557	3,914,615	3,913,434
3,913,291	3,913,784	3,914,347	3,914,559	11 : 3,914,716	3,913,450
3,913,294	3,913,798	3,914,348	3,914,631	3,914,767	3,913,487
3,913,302	3,913,800	3,914,363	3,914,647	12 : 3,913,232	3,913,500
3,913,319	3,913,807	3,914,385	9 : 3,913,202	3,913,233	3,913,528
3,913,326	3,913,808	3,914,402	3,913,246	3,913,254	3,913,546
3,913,332	3,913,836	3,914,417	3,913,275	3,913,255	3,913,566
3,913,339	3,913,846	3,914,457	3,913,287	3,913,333	3,913,578
3,913,376	3,913,850	3,914,464	3,913,330	3,913,351	3,913,589
3,913,379	3,913,857	3,914,525	3,913,346	3,913,548	3,913,616
3,913,399	3,913,864	3,914,534	3,913,347	3,913,549	3,913,649
3,913,402	3,913,880	3,914,540	3,913,398	3,913,574	3,913,655
3,913,413	3,913,881	3,914,541	3,913,417	3,913,641	3,913,685

3,913,693
3,913,705
3,913,715
3,913,717
3,913,718
3,913,725
3,913,736
3,913,738
3,913,750
3,913,768
3,913,782
3,913,786
3,913,788
3,913,792
3,913,867
3,913,872
3,913,876
3,913,878
3,913,901
3,913,925
3,913,943
3,913,948
3,913,968
3,913,979
3,913,985
3,913,986
3,913,987
3,913,995
3,914,042
3,914,080
3,914,110
3,914,111
3,914,165
3,914,184
3,914,203
3,914,214
3,914,271
3,914,303
3,914,307
3,914,340
3,914,349
3,914,412
3,914,414
3,914,415
3,914,444
3,914,445
3,914,447
3,914,483
3,914,490
3,914,501
3,914,503
3,914,511
3,914,520
3,914,545
3,914,565
3,914,582
3,914,594
3,914,663
3,914,681
3,914,725
3,914,741
3,914,755
3,914,756
3,914,757
18 : Re.28,575
3,913,153
3,913,167
3,913,239
3,913,265
3,913,268
3,913,439
3,913,469
3,913,502
3,913,562
3,913,643
3,913,662
3,913,996
3,914,050
3,914,066
3,914,092
3,914,249
3,914,401
3,914,508
3,914,542
3,914,566
3,914,696
19 : 3,913,324
3,913,395
3,913,414
3,913,449
3,913,453
3,913,454
3,913,473
3,913,602
3,913,628
3,913,633
3,913,684
3,913,701
3,913,811
3,913,955
3,913,967
3,913,975
3,914,766
20 : 3,913,150
3,913,411
3,913,530

3,913,700
3,913,720
3,913,794
3,913,916
3,914,121
3,914,130
3,914,424
21 : 3,913,169
3,913,263
3,913,348
3,913,350
3,913,647
3,913,937
3,914,116
3,914,208
3,914,564
22 : 3,913,236
3,913,675
3,913,676
3,913,763
3,914,094
3,914,106
3,914,108
3,914,478
23 : 3,913,785
24 : Re.28,573
Re.28,577
3,913,155
3,913,162
3,913,252
3,913,298
3,913,423
3,913,437
3,913,447
3,913,475
3,913,488
3,913,576
3,913,711
3,913,727
3,913,729
3,913,730
3,913,766
3,913,799
3,913,827
3,913,840
3,913,849
3,914,139
3,914,156
3,914,260
3,914,400
3,914,623
3,914,624
3,914,630
3,914,697
3,914,703
3,914,729
3,914,769
25 : Re.28,578
3,913,277
3,913,278
3,913,281
3,913,290
3,913,329
3,913,375
3,913,568
3,913,604
3,913,625
3,913,661
3,913,699
3,913,721
3,913,828
3,913,869
3,913,886
3,913,927
3,913,942
3,914,017
3,914,062
3,914,117
3,914,144
3,914,173
3,914,237
3,914,258
3,914,395
3,914,446
3,914,484
3,914,492
3,914,495
3,914,549
3,914,596
3,914,611
3,914,628
3,914,644
3,914,648
3,914,679
3,914,709
3,914,744
3,914,770
3,914,777
26 : 3,913,196
3,913,198
3,913,266
3,913,272
3,913,288
3,913,316
3,913,366
3,913,370

3,913,373
3,913,461
3,913,495
3,913,498
3,913,511
3,913,526
3,913,535
3,913,544
3,913,545
3,913,577
3,913,587
3,913,598
3,913,696
3,913,703
3,913,706
3,913,713
3,913,765
3,913,767
3,913,812
3,913,861
3,913,862
3,913,871
3,913,893
3,913,924
3,913,926
3,913,932
3,913,933
3,913,939
3,913,941
3,913,971
3,913,978
3,913,984
3,913,998
3,914,028
3,914,061
3,914,063
3,914,102
3,914,176
3,914,180
3,914,194
3,914,199
3,914,245
3,914,282
3,914,316
3,914,333
3,914,360
3,914,404
3,914,473
3,914,496
3,914,619
3,914,678
27 : 3,913,235
3,913,389
3,913,510
3,913,533
3,913,656
3,913,682
3,913,739
3,913,749
3,913,844
3,913,888
3,913,891
3,914,027
3,914,125
3,914,309
3,914,376
3,914,455
3,914,456
3,914,468
3,914,498
3,914,547
3,914,616
3,914,629
3,914,726
3,914,771
3,914,775
28 : 3,913,762
3,913,953
3,913,959
29 : 3,913,362
3,913,539
3,913,614
3,913,629
3,913,663
3,913,832
3,913,835
3,913,997
3,914,162
3,914,261
3,914,391
3,914,450
30 : 3,913,646
31 : 3,913,349
3,913,534
3,913,619
3,914,168
3,914,408
3,913,697
32 :
33 : 3,914,071
3,914,524
3,914,657
3,914,710
3,914,774
34 : 3,913,147
3,913,151
3,913,159

3,913,183
3,913,200
3,913,212
3,913,230
3,913,293
3,913,391
3,913,405
3,913,435
3,913,477
3,913,484
3,913,486
3,913,506
3,913,516
3,913,525
3,913,597
3,913,634
3,913,741
3,913,746
3,913,751
3,913,769
3,913,774
3,913,779
3,913,803
3,913,804
3,913,805
3,913,842
3,913,866
3,913,884
3,913,895
3,913,896
3,913,904
3,913,944
3,913,954
3,914,038
3,914,039
3,914,058
3,914,067
3,914,077
3,914,090
3,914,109
3,914,136
3,914,157
3,914,158
3,914,171
3,914,177
3,914,178
3,914,185
3,914,189
3,914,193
3,914,197
3,914,227
3,914,231
3,914,232
3,914,233
3,914,256
3,914,283
3,914,285
3,914,294
3,914,297
3,914,314
3,914,317
3,914,318
3,914,322
3,914,331
3,914,341
3,914,356
3,914,377
3,914,393
3,914,403
3,914,405
3,914,406
3,914,409
3,914,418
3,914,428
3,914,430
3,914,451
3,914,465
3,914,475
3,914,494
3,914,554
3,914,556
3,914,591
3,914,626
3,914,643
3,914,645
3,914,684
3,914,691
3,914,702
3,914,704
3,914,711
3,914,717
3,914,743
3,914,750
3,914,758
3,914,762
3,914,764
3,914,768
3,914,785
35 : 3,914,133
3,914,164
3,914,392
3,914,600
36 : 3,913,154
3,913,178
3,913,184
3,913,193

3,913,219
3,913,228
3,913,245
3,913,249
3,913,257
3,913,261
3,913,337
3,913,342
3,913,380
3,913,390
3,913,410
3,913,464
3,913,467
3,913,491
3,913,501
3,913,508
3,913,521
3,913,556
3,913,579
3,913,585
3,913,615
3,913,664
3,913,673
3,913,679
3,913,732
3,913,737
3,913,740
3,913,745
3,913,789
3,913,813
3,913,817
3,913,824
3,913,877
3,913,913
3,913,914
3,913,915
3,913,918
3,913,930
3,913,956
3,914,000
3,914,002
3,914,007
3,914,011
3,914,012
3,914,022
3,914,031
3,914,040
3,914,043
3,914,047
3,914,048
3,914,055
3,914,073
3,914,078
3,914,088
3,914,097
3,914,105
3,914,126
3,914,129
3,914,152
3,914,169
3,914,181
3,914,191
3,914,220
3,914,264
3,914,266
3,914,299
3,914,308
3,914,319
3,914,326
3,914,369
3,914,410
3,914,413
3,914,419
3,914,421
3,914,429
3,914,437
3,914,439
3,914,440
3,914,460
3,914,469
3,914,528
3,914,532
3,914,537
3,914,538
3,914,546
3,914,555
3,914,561
3,914,567
3,914,581
3,914,590
3,914,638
3,914,651
3,914,654
3,914,655
3,914,656
3,914,680
3,914,721
3,914,723
3,914,747
3,914,749
3,914,751
3,914,759
3,914,760
3,914,763
3,914,765
3,914,792

3,914,793
37 : 3,913,191
3,913,421
3,913,443
3,913,552
3,913,622
3,913,863
3,913,909
3,914,163
3,914,637
3,914,640
3,914,641
3,914,738
39 : Re.28,574
3,913,197
3,913,209
3,913,220
3,913,229
3,913,247
3,913,282
3,913,300
3,913,303
3,913,327
3,913,331
3,913,371
3,913,404
3,913,412
3,913,451
3,913,460
3,913,583
3,913,584
3,913,590
3,913,610
3,913,620
3,913,716
3,913,719
3,913,723
3,913,757
3,913,771
3,913,772
3,913,773
3,913,778
3,913,790
3,913,801
3,913,851
3,913,905
3,913,982
3,913,990
3,914,016
3,914,084
3,914,085
3,914,099
3,914,100
3,914,101
3,914,131
3,914,143
3,914,186
3,914,192
3,914,200
3,914,201
3,914,207
3,914,210
3,914,337
3,914,353
3,914,368
3,914,373
3,914,452
3,914,453
3,914,477
3,914,499
3,914,517
3,914,521
3,914,526
3,914,527
3,914,572
3,914,585
3,914,607
3,914,625
3,914,635
3,914,788
40 : 3,913,234
3,913,256
3,913,401
3,913,600
3,913,651
3,913,686
3,913,854
3,913,964
3,913,992
3,914,132
3,914,150
3,914,272
3,914,327
3,914,366
3,914,686
3,914,687
3,914,701
41 : 3,913,286
3,913,472
3,913,558
3,913,744
3,914,529
3,914,551
42 : 3,913,165
3,913,205
3,913,258

3,913,276
3,913,314
3,913,328
3,913,368
3,913,377
3,913,397
3,913,403
3,913,445
3,913,446
3,913,459
3,913,474
3,913,489
3,913,497
3,913,570
3,913,573
3,913,575
3,913,591
3,913,596
3,913,599
3,913,601
3,913,621
3,913,756
3,913,777
3,913,810
3,913,822
3,913,829
3,913,873
3,913,874
3,913,889
3,913,923
3,914,095
3,914,134
3,914,138
3,914,146

3,914,159
3,914,187
3,914,188
3,914,190
3,914,223
3,914,224
3,914,246
3,914,250
3,914,253
3,914,265
3,914,295
3,914,301
3,914,306
3,914,332
3,914,336
3,914,358
3,914,364
3,914,378
3,914,383
3,914,463
3,914,480
3,914,509
3,914,512
3,914,514
3,914,519
3,914,531
3,914,568
3,914,569
3,914,570
3,914,571
3,914,602
3,914,608
3,914,613
3,914,659

3,914,660
3,914,661
3,914,664
3,914,667
3,914,677
3,914,685
3,914,694
3,914,699
3,914,730
3,914,794
3,914,795
44 : 3,913,527
3,913,743
3,913,770
3,914,621
3,914,773
45 : 3,913,190
3,913,499
3,913,635
3,913,637
3,913,638
47 : 3,913,359
3,913,452
3,913,505
3,913,657
3,913,731
3,913,752
3,914,229
3,914,371
3,914,388
48 : 3,913,186
3,913,227
3,913,248
3,913,343

3,913,352
3,913,385
3,913,428
3,913,438
3,913,462
3,913,529
3,913,567
3,913,586
3,913,630
3,913,632
3,913,668
3,913,674
3,913,678
3,913,688
3,913,735
3,913,747
3,913,748
3,913,806
3,913,820
3,913,837
3,913,883
3,913,885
3,913,980
3,913,988
3,914,014
3,914,069
3,914,115
3,914,127
3,914,148
3,914,149
3,914,196
3,914,198
3,914,202
3,914,252

3,914,254
3,914,296
3,914,320
3,914,342
3,914,384
3,914,386
3,914,449
3,914,560
3,914,577
3,914,598
3,914,601
3,914,603
3,914,692
3,914,693
3,914,698
3,914,715
3,914,745
3,914,748
3,914,752
49 : 3,913,251
3,913,260
3,913,280
3,913,698
3,913,780
3,913,795
50 : 3,913,372
3,914,727
51 : 3,913,179
3,913,218
3,913,513
3,913,550
3,913,691
3,913,811
3,913,870

3,913,920
3,914,001
3,914,217
3,914,422
3,914,433
3,914,518
3,914,675
3,914,689
53 : 3,913,295
3,913,572
3,913,665
3,913,911
54 : 3,913,338
3,913,687
55 : 3,913,152
3,913,185
3,913,189
3,913,273
3,913,305
3,913,344
3,913,409
3,913,426
3,913,517
3,913,532
3,913,680
3,913,692
3,913,694
3,913,843
3,914,037
3,914,510
3,914,674
3,914,722

DESIGN PATENTS

4 : 237,250
237,282
237,286
6 : 237,225
237,240
237,249
237,260
237,272
237,313
237,314
9 : 237,248
237,322
10 : 237,238
237,239

12 : 237,295
237,310
17 : 237,258
237,259
237,315
237,317
237,321
19 : 237,237
21 : 237,299
237,300
237,301
237,302
237,303
237,304

237,305
237,306
24 : 237,228
237,230
26 : 237,236
237,244
27 : 237,276
237,284
29 : 237,252
237,262
237,263
237,264
237,265
237,266

237,267
237,268
237,269
237,270
237,271
30 : 237,247
34 : 237,227
237,280
237,297
36 : 237,223
237,281
237,287
237,288

237,311
39 : 237,231
237,251
237,253
237,254
237,255
237,256
237,257
237,278
237,283
237,292
237,293
40 : 237,234

237,279
41 : 237,232
42 : 237,233
237,235
237,242
237,273
237,275
47 : 237,241
48 : 237,274
49 : 237,289
237,298
53 : 237,294
55 : 237,296

U. S. GOVERNMENT PRINTING OFFICE : O - 1975

U.S. DEPARTMENT OF COMMERCE
Rogers C. B. Morton, *Secretary*

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, *Commissioner*